ELECTRICAL REVIEW

Managing Editor: HUGH S. POCOCK, M.I.E.E.

Technical Editor: W. O. FENWICK, M.I.E.E. *Industrial Editor:* J. H. COSENS

Technical Consultant: C. O. BRETTELLE, M.I.E.E.

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EDITORIAL, ADVERTISING & PUBLISHING OFFICES: Dorset House, Stamford St., London, S.E.1.
Telegraphic Address: "Elecrev, Sedist, London." Code: ABC. Telephone No.: Waterloo 3333 (60 lines).
Annual Subscription: Great Britain and elsewhere £3 0s. 0d. Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW, and crossed "Lloyds Bank." Entered as Second Class Matter at the New York, U.S.A., Post Office.

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ELECTRICAL REVIEW

ESTABLISHED 1872

Vol. CXLIV. No. 3711
7th JANUARY, 1949

Electricians' Wages

PROFITS IN THE CONTRACTING INDUSTRY

WE have received from Mr. Frank Foulkes, president of the Electrical Trades Union, a copy of a statement made by the Union before the National Arbitration Tribunal in support of a claim for a substantial increase in wages for its members in the electrical contracting industry. The Tribunal, it may be remembered, awarded journeymen electricians an increase of 1d per hour.

It is far from our intention to dispute the justice of the claim put in by the Union but we may fairly comment on the presentation of the case without being accused of bias. The principal contention was that the electrical contractors could well afford to pay substantially higher wages, and in support of this argument the Union attempted to arrive at an assessment of profits in the industry. As the overwhelming number of electrical contractors are either individuals, small firms or private companies, nothing could be discovered about their financial results.

Simple Arithmetic

Nevertheless it is contended that profits must be substantial because eight large concerns whose accounts were available had done very well. The eight are shown to have had an aggregate profit of £552,627 in 1947-48 and it is deduced from this that these and another 32 firms employing 100 or more operatives must have made a total trading profit of £2,763,135. This appears to be an effort of simple arithmetic: £552,627 ÷ 8 × 40—too simple to be good.

Then when the eight selected companies are examined it is found that among them are Trollope & Colls, G. N. Haden, Peter (? Peto) Scott Electrical Instruments (Thorpe & Thorpe) & Clinsty (possibly Christy) Bros. & Co. It is well known that electrical contracting forms only a part of the activities of these concerns. The others dealt with are Drake & Gorham, Newman & Watson, Strand Electric Holdings, Franco Signs and Rawlings Bros., not all of whom are electrical contractors pure and simple.

Increased Output Claimed

The next section of the statement relates to productivity. It was on this point that Mr. Foulkes objected to our quoting a statement made by the National Federated Electrical Association. Here, in default of any means of gauging the output of the electrical contracting industry, the Union is forced to consider conditions in the building industry, of which, it is maintained, the electrical contracting industry is part. Employing the interim index of production of the Central Statistical Office and the Ministry of Labour's manpower figures, it is calculated that the increase in productivity in the building industry has been 21 per cent since 1946. Other statistics are also used which show an increase in productivity of between 14 and 18¼ per cent. It is stated that the introduction of the 44-hour week has not had an adverse effect on production; indeed the opposite is said to be the case.

Comparative earnings are dealt with in

the last section of the statement. It is claimed that the electrician in the contracting industry has suffered by comparison with those in other comparable industries. An appendix shows that "differentials" have definitely gone against those employed by electrical contractors. Average hourly earnings were 3.4d higher in general engineering, 4.2d higher in electrical engineering and 5d higher in shipbuilding. The wages of certain other skilled craftsmen are quoted to show the disparity which exists.

As we have said, we do not intend to usurp the Tribunal's function by passing judgment on the Union's case. The fact that an increase was granted suggests that the Tribunal was impressed, but we think that some of the arguments might have been better based.

THE HONOURS LIST

HAVING regard to the tremendous amount of work involved in the transfer of electricity supply to national ownership it cannot be said that the New Year Honours List is over-generous to those concerned in the change-over. It is satisfactory to see that Mr. John Hacking, deputy-chairman of the B.E.A., receives a well-earned knighthood and that Col. E. H. E. Woodward's services are recognized by his appointment as a C.B.E. Mr. J. A. Lee (O.B.E.), Mr. E. L. Morland (M.B.E.) and Mr. W. Ross (M.B.E.) are other B.E.A. officials included in the list. Among the other new knights are Mr. A. J. Gill, engineer-in-chief of the G.P.O., and Dr. H. L. Guy, well known to the electrical industry for his work on turbines and steam tables. The engineering side of the B.B.C. is represented by Mr. R. T. B. Wynn, who becomes a C.B.E.

TAXATION AND MODERNIZATION

THERE is great force in the argument presented to the Chancellor of the Exchequer by the Federation of British Industries that the plant depreciation allowances set against the income tax of industrial concerns have become unreal. Although replacement costs are anything from two to three times the pre-war values, depreciation allowances are based on the original cost of the plant which means that only half or a third of the actual replacement value is covered. Another of the Federation's points is that taxation is so severe that it is impossible for industry to provide additional working capital from its own resources. The reliefs proposed are a special allowance for 1949-50, and subsequent years, separate from the wear-and-tear allowances and not deductible from the written-down value of the equipment; and a substantial reduction of tax on companies' undistributed profits.

BRIGHTER TOWNS ?

A CONSIDERED case for the resumption, on a modest scale, of the use of illuminated shop signs is put forward by the Electrical Sign Manufacturers' Association, which is connected with B.E.A.M.A. From the electricity supply point of view, if kept outside the peak-load hours—the period from 7 p.m. to midnight is suggested—there is no reason why such a concession should be an embarrassment. In fact, the Association says that to keep within their total power allocation, shopkeepers would be induced to economize during the day in order to take advantage of the permitted lighting at night. There would be little risk, in any event, in lifting the ban during the summer months when the extra amenity would greatly help in the campaign to attract overseas visitors to this country.

WIRING BY BOARDS

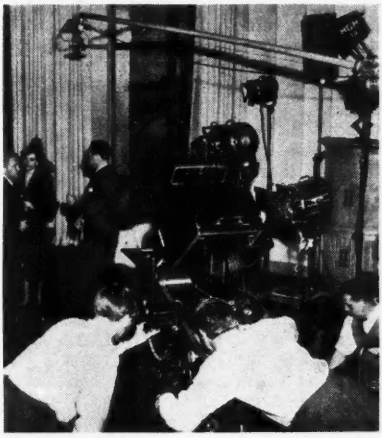
IN October the British Electricity Authority decided that the Electricity Boards should be free to carry out electrical installation work if they wanted to. This continuation of the practice of many former authorities—company and municipal—is likely to harm "private" contractors only if conducted on uncommercial lines. In announcing its intention of extending through its area, "on a uniform basis," the contracting business carried on by twenty-three of the vested undertakings, the Merseyside and North Wales Board says that its terms will include a fair provision for overhead expenses so that competition with private contractors will be equitable. Although the Board will probably have a "pull" with the public, the contractors may possibly be able to derive some measure of comfort from this assurance.

Film Production

EXTENSIVE ELECTRICAL EQUIPMENT AT THE M.G.M. BOREHAM WOOD STUDIOS

THOUGH structurally completed before the war, the Boreham Wood film studios of M.G.M. British Studios, Ltd., have only within the past eighteen months been equipped for film making, and are still not in their final state. It is claimed that, when completed, they will be the most modern in Europe, if not the world. Five studios, the largest 200ft by 100ft, are already in use, and two more under construction will bring the total studio area to 80,000 sq ft.

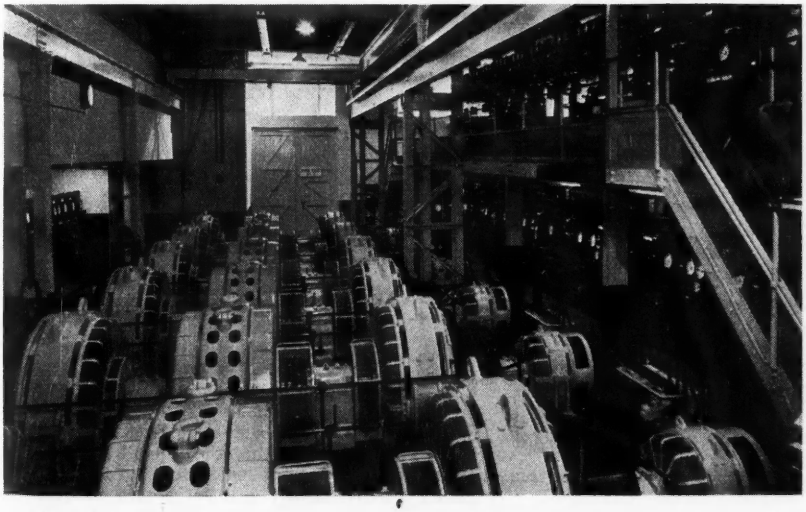
As the load for a single studio may be nearly 4,000 kW, it will be realized that the electrical installation is of considerable magnitude. The advent of the colour film has increased the lighting requirements to at least three times that required for black and white films so that a studio may require as many as 200 lamps, each of them operating at 150 A on a 115 V supply.



Shooting a scene from "Edward My Son" showing Spencer Tracy, Deborah Kerr and Ian Hunter

Special apparatus providing the effect of lightning, rain and wind contribute to the electrical load, while the carpenters' and machine shops, and other departments engaged in producing special devices required in film-making are all

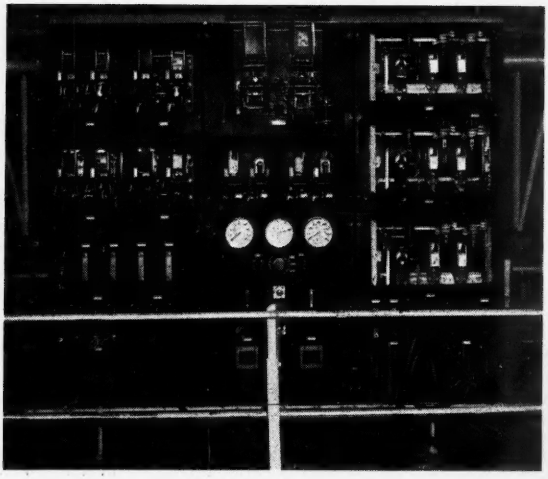
General view of the power house, six 500-kW motor-generator sets and switchboards



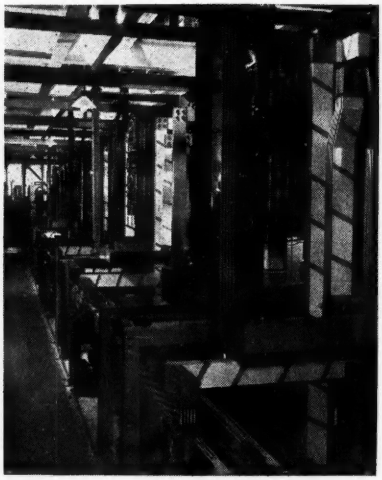
extensively equipped with electrical apparatus. Infra-red ray heating is to be used for silk-screen printing, softening of plastics, paint drying and the making of plastic casts.

Both the hair-dressing and make-up rooms are liberally lighted with ceiling and mirror fluorescent lighting, and the former is equipped with electric curling tongs, hair-dryers, etc. An electric baking oven is employed in the wig-making department where the "library" of human hair of all shades is kept in "Perspex" containers.

Electrical devices developed for wartime purposes are employed for the remote control of the focus of the cameras and special projectors. The "Magslip," developed for synchronizing gun control, operates on a.c. while a step-by-step controller, as used for actuating the throttles of multi-engine bombers, employs d.c. The latter is generally preferred since it is noiseless in operation.



Main d.c. distribution panel on stage gallery. Note contactors remotely controlled from floor of stage



Back of main d.c. generator control panel

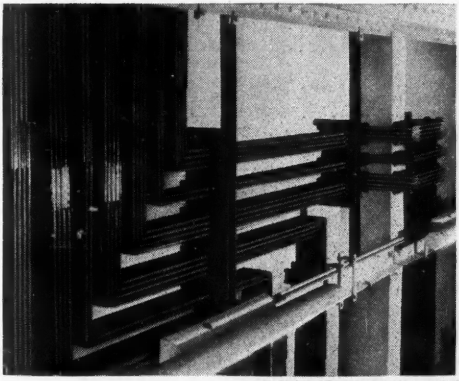
For sound reproduction the latest Western Electric 200-mil push-pull system is employed with pre- and post-equalization. For production use there are four portable channels housed in specially designed dollies with two earlier type "dolly" channels held in reserve. Associated equipment includes Mole-Richardson booms, disc recording and play-back machines, public address systems and two portable mobile channels built into station wagons for location purposes. For music recording and "dubbing," fixed equipment installed in a control building comprises six recording and sixteen re-recording machines, together with two disc recorders.

Eventually four projection theatres will be available. One is normally used for daily rushes and reviewing, but is also equipped for dubbing. Both in this theatre and a similar one, which is in addition available for post-synchronizing and effects recording, the dubbing consoles are equipped with sliding instead of the more usual rotary potentiometers. The third theatre is for cutting, while the fourth, still under construction, is in part stage and is, therefore, much larger than the others. Primarily intended as a music scoring stage, it in-

corporates an echo room, a screen, green rooms, rehearsal and instrument rooms. Simplex "E7" projectors are installed with Western Electric "Mirrophonic" ("Westrex") reproduction equipment. Experiments have been undertaken with cold-cathode lighting, and it is proposed to install it in some of the cinemas, fitted with dimmers.

In the stills studio is a large spot rail capable of carrying twelve 2,000-W lamps. The latest arc lights and spotlights are also provided. The dark rooms have thermostatically controlled electrically heated developing tanks, rotary copiers, mercury-vapour lamps, and guillotines.

To ensure the highest quality of photography a completely clear atmosphere is essential, and for this purpose an elaborate air-conditioning system has been provided requiring for its various fans, pumps, etc., a total of 275 h.p. of electric motors. To prevent the entrance of air from outside a slightly positive air pressure is maintained in the studios.

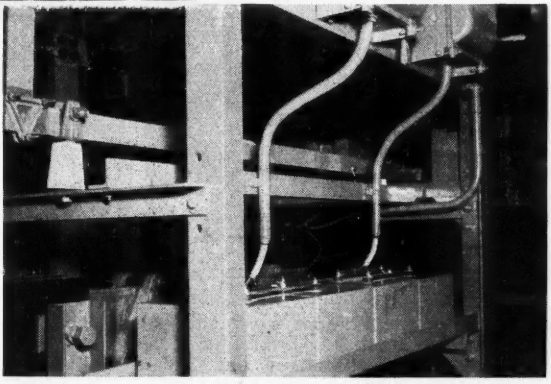


The warming of the buildings is carried out by means of a super-heated hot-water system supplied by three "Economic" oil-fired boilers giving 10 million B.Th.U. per hour each. In the centre of the boiler house is a control panel equipped with thermometers, draught gauges, CO_2 indicators and push buttons for controlling the induced draught fans, blowers and oil pumps. Radiovisor oil-flame indicators are also provided. All the oil firing plant is in duplicate. Each stage has outlets on either side for water, gas, compressed air and low pressure steam for special effects.

Electricity Supply System

To provide the necessary power for all these various electrical appliances an 11-kV three-phase supply from the Eastern Electricity Board is taken through a bank of ten B.T.H. type "QF" draw-out oil circuit breakers of 150 MVA rupturing capacity to (a) two 500 kVA 400/230 V B.T.H. transformers which supply the whole studio requirements for lighting and power and (b) three B.E.T. 11/3.3 kV, 1,600 kVA, outdoor transformers, delta/star connected, specially designed for continuous 100 per cent overload.

These transformers feed the motor-generator sets supplying d.c. for stage lighting. To minimize noise, always an important consideration where sound film recording is concerned, these transformers, besides having a low flux density, are mounted on anti-vibration pads. They

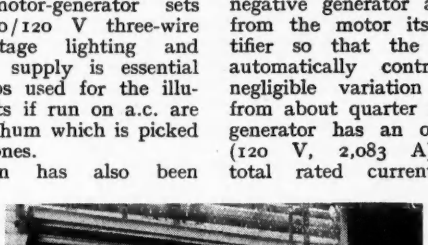


(Left) Aluminium bus-bar feeders to stages leaving the main board and (below) smoothing condensers for eliminating ripple

are fitted with a double-float Buchholz protective relay, an off-circuit tapping switch, a 6in. dial safe-load indicator, conservator and silica-gel breather.

From the transformers the 3.3 kV supply is fed into three manually operated Crompton Parkinson air-insulated, horizontal draw-out truck type oil circuit breaker cubicles, with a rupturing capacity of 75 MVA. Six similar circuit-breakers arranged for solenoid closing, control the supply to six 500 kW Crompton Parkinson motor-generator sets which provide 240/120 V three-wire d.c. for the stage lighting and power. This d.c. supply is essential since the arc lamps used for the illumination of the sets if run on a.c. are liable to develop a hum which is picked up by the microphones.

Special attention has also been devoted to the design of the motor - generator sets to minimize d.c. ripple. By increasing the number of segments of the commutator, skewing the slots, and reducing the flux density the ripple between 700 and 1,500 cycles is only 0.04 per cent. A 2,500 μF condenser is employed to reduce the ripple further to 0.01 per cent.



Fluorescent lighting is employed extensively in the hairdressing rooms

These features of design result in the elimination of the costly and cumbersome chokes normally employed, the only smoothing equipment installed being the above-mentioned condensers connected across the busbars in the power house. To reduce further the noise and vibration in the vicinity of the studios the machines are mounted on substantial foundations and bedplates and have been designed to operate quietly by reducing hum and windage noise to low levels.

Each motor-generator set comprises a 750 h.p., 600 r.p.m., 3.3 kV auto-synchronous motor driving two d.c. generators and an exciter for the motor. The machines are arranged in tandem, with the motor between the two generators. The auto-synchronous motors are designed to operate at unity power factor from no load to full load with fully automatic control.

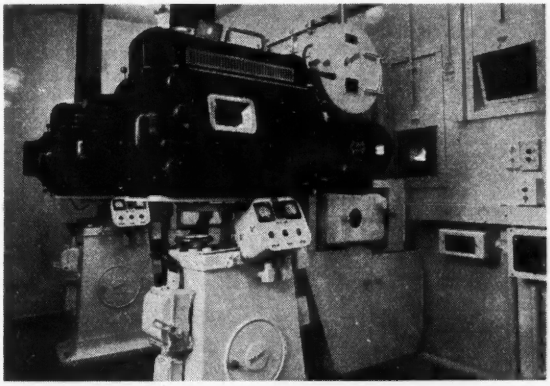
The generators are level compound wound and the field on the exciter is split, one half being excited from the negative generator and the other half from the motor itself through a rectifier so that the exciter output is automatically controlled to give a negligible variation of power factor from about quarter to full load. Each generator has an output of 250 kW (120 V, 2,083 A). Although the total rated current output of the six two-generator units is thus nearly 25,000 A, the plant is designed to withstand a 100 per cent overload for twenty minutes. This makes it possible for the two largest studios, each using up to 32,000 A at 115 V, to shoot colour films simultaneously. The machines are blast cooled by air brought in through the roof, filtered and slightly warmed.

A twenty-panel d.c. switchboard controls not only the outgoing feeders to the studios but also the output from the generators. Incorporated in this board is a motor panel which remote-controls the solenoids of the six 3.3 kV motor-generator panels and in this way operates the automatic liquid resistance starters of the motors.

Interlocks are provided to prevent the solenoid closing until the resistance is returned to the "all-in" position. An anti-pumping relay prevents rapid reclosure

of the starter switch in the event of a failure to start.

From the gallery of the power house two three-wire feeders (each comprising two 6in by ⅛in aluminium bars in each outer and one 6ft by ⅛in mid-wire) are taken to each studio where they are fed into ring mains running right round the buildings at gallery level and feeding eight distribution points, six at high level and two on the floor. These feeders, which have clamped joints, are so designed that the maximum voltage drop on full load, from the switchboard to the farthest point of distribution, is



Two of the latest type of projectors used

5 V. This question of voltage drop is of paramount importance since the light output and the colour emitted by the arc lamps are affected by it. After the first 5 V there is, in fact, no less than 10 per cent decrease in light output per volt drop.

At each of the six high-level distribution points in the studios is a switchboard comprising a main 2,000 A double-pole air circuit-breaker, four 400 A double-pole air circuit-breakers and three 400 A double-pole contactors controlling sub-feeders, together with two 30 A air circuit-breakers for low-current supply. To enable light sequence or group control to be effected from the "set" the 400 A contactors can be remote controlled from portable consoles. Each of the two distribution switchboards on the floor has a capacity of 4,000 A.

For special effects such as lightning, dimming and for apparatus requiring special voltage there is a third circuit (4,000 A) fed from a double bus-bar on the main d.c. board in the power house which can be connected to any of the six motor-generator sets. This supply is controlled from two switchboards on each stage through motorized shunt regulators. Each studio feeder is provided with a new type of electronic summation recording and indicating ammeters and kWh meters and the whole is mounted on a separate meter panel in the power house, together with a two-pen d.c. Evershed Vignoles recording voltmeter.

A 60-kW twin-bulb mercury-arc rectifier fitted with an automatic voltage controlled induction regulator supplies d.c. from the 400/230 V a.c. supply which is available for light duty during night-time or during the lunch interval.

To prevent stoppage of production during load shedding or power cuts there are three "V12" Paxman diesel engines direct-coupled to 330 kVA Crompton Parkinson alternators generating at 440 V, which is stepped up to 11 kV and fed on to the e.h.v. switchboard. This emergency supply is sufficient to supply the studio lighting and power and enable two black and white films to be shot simultaneously. Switching arrangements are being carried out to enable these sets to take part of the studio load and so reduce the maximum demand during restricted hours.

Variation in the mains frequency of the supply for the camera motors, back projection drives and sound channels is overcome in the Sound Department by the use of two 30-h.p. d.c. motors each driving a 20-kVA alternator fitted with a Brookhirst Pearson electronic frequency controller and Stones automatic regulator. By this means the frequency of the 220 V three-phase 50 cycle supply is held to 0.1 per cent and the voltage to 1 per cent.

For certain processes such as film printing and trick work, a d.c. supply

correct to ± ¼ V with intermittent load up to 20 kW is required. To provide this a special motor-generator set is installed in the appropriate department, which gives a constant voltage d.c. supply within the limits mentioned above. The control of this set is maintained by one of the latest "Eccodyn" electronic controllers made by the Electric Construction Co.

Apart from the design of the electrical plant itself, other special precautions with the object of minimizing noise have also been made. From remote-control panels on the floor of the studios the sound operators press buttons which switch off the ventilating plant, electrically operate locks on stage and doors, put on flashing red lights over the doors and turn to red the traffic lights on the roads outside the studios.

Elaborate precautions are also taken against fire. The sprinkler system controller has an electrically driven booster pump operated by pressure valves. In parallel with this is a petrol-driven set for use in case of a mains failure. Fire-alarm buttons provided in every studio and important building are wired to an indicator board in the fire station. Indicators can also be operated by a pressure switch in the sprinkler room. A Magneta master clock system with slave dials in all workshops is provided and there is an automatic bell system for announcing tea breaks, "knocking-off" time, etc., driven by this clock. A private automatic branch telephone exchange has been installed by Standard Telephones & Cables, Ltd.

The contractors for the motor-generator plant and switchboards were Crompton Parkinson, Ltd., with Barlow & Young, Ltd., who installed the diesel plant, acting as sub-contractors for the d.c. bus-bars. The a.c. lighting and power installations were put in by Troughton & Young, Ltd., and the heating, ventilating and auxiliary services by Ashwell & Nesbit, Ltd.

We thank Mr. T. A. Waterworth, the chief electrical and maintenance engineer of the studios, for his assistance in preparing this article.

Illuminated Signs

Minister to be Asked to Relax Ban

THE Electrical Sign Manufacturers' Association is to approach the Minister of Fuel and Power soon with a proposal for the brightening of the towns and cities of Britain after dark by illuminating shop fronts. This can be achieved, the Association believes, by partial relaxation of the present ban on the use of outdoor electrical signs. The manufacturers contend that the proposed relaxation can be put into operation without any increase in the amount of fuel and power at present consumed.

Mr. Gaitskell will be asked to lift the ban between the hours of 7 p.m. and midnight —that is, during the off-peak power consumption period. The relaxation is sought only for signs describing the name of the firm and the nature of the business carried on in the premises on which the sign is exhibited. It is suggested, also, that the use of such signs should be subject to the present total power allocation of the premises concerned; that is 1½ W per sq ft of floor area, less 25 per cent during the winter months.

The advantages of the scheme would be that Britain's cities would regain some measure of their pre-war brightness and lose their reputation of being the drabbest in the world after dark; a brighter Britain would encourage visitors from overseas; the location at night of garages, restaurants and places of amusement would be made easier for strangers and overseas visitors; and the morale of the public would be improved by some measure of colourful variety to offset the present austerities.

Another point is that business houses would be encouraged to reduce their power consumption during peak hours in order to use the electricity for illuminating signs during the off-peak period. Many thousands of pounds worth of valuable electrical equipment could be brought into use after nine years' idleness, and the sign manufacturing industry, at present producing for export only, would have an opportunity of rebuilding its home trade.

I.E.E. Summer Meeting

THE first summer meeting to be arranged by the Institution of Electrical Engineers since before the war is to take place during the week commencing Monday, 30th May, 1949, at the invitation of the chairman and Committee of the Scottish Centre. The itinerary will include Edinburgh, Pitlochry and Glasgow.

Manufacturing Progress

SURVEY OF ACTIVITIES DURING PAST YEAR

ORDERS for turbo-alternators received during last year by the **English Electric Co., Ltd.,** included a second set for Stourport "B," one each for the new Drakelow and Tilbury stations, and two for the Windsor station of the Hydro-Electric Power Commission of Ontario, all hydrogen-cooled 60,000 kW sets for high steam pressures and temperatures. A second 25,000 kW set has been put in hand for Balmain, N.S.W., a further 15,000 kW set for Kanpur in India, three 6,250 kW pass-out machines for a new oil refinery in Scotland, and a 2,800 kW back-pressure set for a Hull factory. Plant dispatched included three 30,000 kW sets for home stations and six of 7,500 kW for oil refineries in the Dutch East Indies and South America.

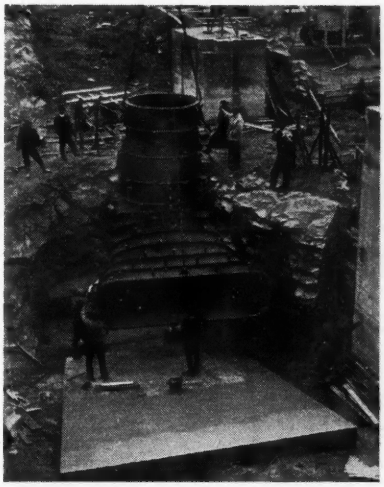
Two more 12,000 kW water-power alternators have been ordered for Sengulam in Travancore State, including switchgear and transformers; a third set of 2,500 kW for the Newfoundland Light & Power Co., while four draft tubes for 45,000 h.p. hydro-electric generators are being erected at Loch Sloy for the North of Scotland Board, and three draft tubes for 73,000 h.p. turbines are now in position at Castlo de Bode in Portugal.

Orders for a very large number of diesel engines include generating sets for six stations in East Africa, three in Australia and others for Egypt, apart from diesel-electric locomotives for railways at home and abroad.

Customers abroad ordered 165 and 132 kV air-blast circuit-breakers and a four-switch installation is being made for Brighton. An outstanding feature of business last year was the large number of big transformers ordered for export, particularly three-phase 110 and 132 kV units for Australia, where the general practice has hitherto been to install banks of single-phase units.

Most of the mercury-arc rectifiers ordered last year are to go abroad. The company is to dismantle, overhaul and re-erect in Tasmania for the Australian Aluminium Production Commission the 41,200 A, 675 V pumped steel tank installation it made during the war for the Ministry of Supply for the electrolytic production of aluminium in South Wales.

An order has been received for what is believed to be the largest semi-automatic skip hoist in the world. Twin d.c. motors operating on the Ward-Leonard Ilgner system will drive a common pinion geared to a double drum, each drum being clutched; "Magnavolt" control will be used and, in addition to the usual mechanical braking of the flywheel set, d.c. dynamic braking of the a.c. motor will be incorporated. This hoist, for a copper mine in Northern Rhodesia, will be rated at 3,636/7,000 h.p., and will raise 23,600 lb from 1,950 ft at 2,500 ft/min.



Placing in position the third draft tube for four 45,000 h.p. water turbines at Loch Sloy—English Electric Co.

Orders for the National Coal Board included equipments for four sinking hoists, and the demand for colliery motors continued, including the recently developed 3,300 V drip-proof induction "LD" squirrel-cage type and the "LDS" type with flameproof slipring gear.

The purchase of rolling mill drives was fully maintained by the metal industries of South Wales, North-West England, the Midlands and Australia. The mill pinion housing has been eliminated from a 9,600 h.p. reversing twin motor drive ordered for the hot-rolling of steel slabs and blooms in North-East England. This will be the second drive of this size to be supplied by the company and is the largest in any country, except the United States of America, where there are a small number of 10,000 h.p. examples of equal torque rating.

An example of industrial electrification is malting plant in Birmingham, to be housed in a ten-storey ferro-concrete building. Machinery for the automatic laying and turning of the steeped barley on the germinating floors, which will be kept at a uniform temperature by air conditioning and refrigerating plant, resembles overhead travelling cranes; it will be driven by variable-speed motors supplied from d.c./d.c. Ward-Leonard generator sets mounted on the machines themselves. Overhead transmission to the machines is at 110 V d.c., the contract including the complete electrification of the unloading, screening, conveying, kiln and packing plants.

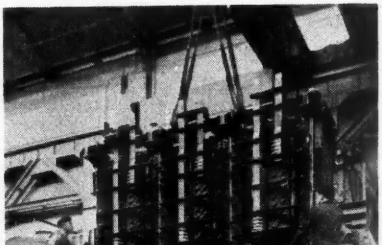
The electrification of the first section of the cotton mills of a Lancashire spinning company was completed, including nearly 200 motors ranging from 1½ to 9 h.p., switchgear, distribution fusegear, cabling, millwrights' work and contracting. In the second section of the mills several group-drive motors of 50, 100 and 250 h.p. will be installed. Another Lancashire mill will contain over 150 English Electric loom drives, and drives have been supplied for woollen and worsted mills in Leicester, for Scottish jute mills, and several important orders were received by the company for jute mill electrification in India.

Further Plant for Scotland

Heavy demands, particularly for rotating machines, were experienced by **Bruce Peebles & Co., Ltd.**, who were the main contractors for Scottish Highlands water-power plant. Two 500 kW horizonal alternators for Lochalsh and two 417 kW vertical sets for Morar (see *Electrical Review*, 31st December, 1948) are of interest because of the diversity of their fault-protection devices, since both stations are semi-attended.

Four 10,000 kW vertical alternators (two for Loch Fannich and two for Loch Luichart) are in hand, and additional orders have been received for ten 1,000-kW engine-type alternators for various isolated areas in Scotland where hydro-electric power cannot be made available.

An outstanding feature was the large proportion of orders for motors. Mining in particular created increased demands for flameproof motors.



One of the four largest oil-immersed reactors to be built in this country

Indirect export orders have been received for a 1,720 kW geared turbo-alternator and a 1,000 b.h.p. low-speed induction motor for Australia; seven 940 kW engine-type alternators (five for Uganda and two for Kenya); nine low-speed synchronous induction motors (four 1,900 b.h.p. for South Africa, three 1,200 b.h.p. for Australia and two 1,200 b.h.p. for Portugal); and flameproof motors for oil works in many parts of the world.

Among direct export orders are two 10,000 kW hydro-electric alternators and synchronous condensers of 15,000 and 10,000 kVA for New Zealand. Norwegian requirements include two 14,000 kVA alternators and others up to 5,200 kVA

for various hydro-electric schemes. Two 900 b.h.p., 163 r.p.m. induction motors put into operation are said to be the largest in use in the cement industry in Australia and are of special interest because they are all-welded jobs.

The Company has added a 1,250,000 V impulse plant to its equipment for the routine testing of super-voltage transformers. Orders for units up to the largest sizes for up to 132 kV have broken all previous records. Of special interest are three 8,000 kVA and twelve 1,250 kVA transformers for a Scottish oil refinery. The first of four 3-phase 33,000 V oil-immersed magnetically shielded reactors for the B.E.A. was tested at the Short Circuit Station at Hebburn-on-Tyne successfully up to a full value of approximately 400,000 kVA. They are believed to be the largest oil-immersed units of their type to be built in this country.

Great activity was experienced throughout the year on transformers for all parts of the world. Among new export orders are large numbers of distribution transformers for Uganda, 18,000 kVA of transformers for Canada and thirty 4,750 kVA rectifier transformers with auxiliary and inter-phase transformers for Switzerland.

Orders for mercury arc rectifiers included equipments for railway electrification and from the National Coal Board for oil-immersed rectifiers for charging batteries on mine cars underground.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Consulting Engineers as Contractors

THE *Electrical Review* of the 24th December refers to a report presented to a borough council by one of the Electricity Boards offering the services of the Board in a consulting capacity, and stating further that the Board, in certain areas, is prepared to carry out the work of installation in the event of its tender being accepted, at the same time forgoing the fee for the professional work involved.

The experienced contractor, who is accustomed to tendering and subsequently to working to a properly drawn specification, needs no telling that it is not difficult to draft a specification calling for certain requirements (which the genuine contractor must cover in his quantities) not really necessary and which will not be demanded in the execution of the works. The consulting engineer who is interested in a particular contractor can easily arrange with him beforehand that certain specified details can be ignored in preparing the tender.

Any borough council, education committee or other public body, as well as industrialists, should be warned that such an offer by no means guarantees value for their money, or even a return for the money which, apparently, would be saved if the consulting fee were withdrawn as a result of contracting work undertaken.

We are all familiar with the old arguments against the operation of a contracting department by a municipal electricity undertaking, whereby losses could be incurred in that section and duly whitewashed in the accounts of the undertaking. However, this development by the B.E.A. lends itself still more to abuse. What is the reason for this encroachment by bureaucracy on two important branches of electrical engineering?

"ENGINEER."

Fine Copper Wires

IN reply to Mr. A. Rist's letter (24th December), I would say in all seriousness "You have been warned." Built-up strands of 0.012in wire, either of copper or copper and steel combined, are a menace when used in flexibles attached to electric portable tools, etc. As a factory electrical engineer of very long experience, and with some 3,000 electric tools to maintain, I think I can speak with authority.

On the one hand I know I have my own experiences and point of view; on the other, the electrical contractor may welcome the use of the very flexible which I am condemning because it is a source of constant revenue in repairs to vacuum cleaners, toasters, irons and

drills, etc. It also means repeat orders to C.M.A. members. However, I feel I have only done my duty in raising the matter.

I have a fleet of cars and lorries to maintain at our works and I have a friend in business (with three branches) as an automobile electrician. He confirms my view regarding the troubles with loom wiring on cars, with the present build-up of flexibles. Personally, I prefer a conduit or trunk system with a colour scheme, designed so that additional wires can be pulled in, or faulty ones replaced, rather than patch on wires to an existing loom or, alternatively, purchase a complete new one.

The query in Mr. Rist's final paragraph is significant.

C. J. BENNETT,
Chartered Electrical Engineer.
Yeovil.

[This correspondence is now closed.—Editors, *Electrical Review*.]

Long-Distance Power Transmission

IN the very valuable I.E.E. paper by F. J. Erroll and Lord Forrester a great deal is made of the water power in Tibet, but it is one of the most inaccessible spots in the world. In the discussion at Birmingham on 6th December I had intended to convey some information about water power in India, entirely in India and therefore accessible immediately, which I have "nursed" these ten years, but time failed. Once every year the Indus (or a tributary) overflows, *at the height of* 15,000*ft*, at the Shyok dam, and a terrific volume of water (so great that there is a fear of Indian Government bridges, 1,000 miles away, being carried away) dashes through the mountains, gorge after gorge, till it reaches lower Sind.

From data which I possess, I estimate that 10,000,000 to 20,000,000 kW is available at that time. I have Government ordnance maps of the area and believe that, by a series of some ten dams, a large portion of this water could be deflected into side ravines fairly cheaply and stored for later use; and that anything up to 5,000,000 kW could be normally obtained all the year round.

Now, if what I incidentally alluded to at the meeting should be accepted (and I know of no convincing reason why not) we could extend a present 500-mile transmission (without increased voltage) to 1,000 miles for approximately one-half of the cost of doing this by the usual method of adding a third circuit and, in addition, could secure transient stability, which the adding of the extra circuit would *not* do. We could continue for another 250 miles at about three-quarters of the cost of the other circuit, again without sacrificing transient stability. The above is subject to the power being at 100 per cent load factor (some 94 per cent has been obtained in Tasmania).

Since the power is at a very high head, it should be exceedingly cheap and would be well worth securing, even if one had to go 500 to 750 miles farther to do so. By employing "over-compounded" instantaneous quadrature boosters (whose primaries are fed by the capacitive currents of the line), we could go farther and farther afield (at the same voltage) and the cost per mile for boosters stays at a fairly constant figure. No other system possesses this feature. "Ohmic" resistance of line, moreover, can only be dealt with by our methods.

I have not in this letter shown *how* we can double the power of an existing 500-mile line. This I hope to show shortly in an article to be contributed to one of the leading engineering journals and more fully to the I.E.E.

May I add that, when once we get into Kashmir, there are the Chanab and the Jhelum and the Shyok and the Ravee, the Punch and numerous other rivers, enough to form an electrical engineer's paradise. All fed by the melting of "the Eternal Snows," so having six to nine months' storage capacity. Thus, the cost of dams would be greatly reduced.

Selly Oak, A. M. TAYLOR.
Birmingham, 29.

Electricity Supply Salaries

LOOKING at recent advertisements of British Electricity Authority vacancies in your columns makes me wonder whether chief and senior engineers have any pride in the electricity supply profession nowadays. Are they content to line themselves up in salary and status alongside purchasing officers, liaison officers, labour relations officers, etc.? I have not seen any protest anywhere from any of them so far.

It would be interesting to know what some of them think about £1,000 a year

for a window dresser, compared with the £500 a year for which many of their "twenty-four hour availability, life and death responsibility" engineers have to struggle so hard and so long to get.

The *raison d'être* of the B.E.A. is to generate and distribute electrical energy, and surely those engaged in these basic functions should be rated higher than—or at least as highly as—those engaged in welfare, advertising, and window dressing, or those contributing to the avalanche of paper that is slowly but surely stifling our nationalized industry.

"JOHNNY."

Professional Institutions

YOUR correspondent "J. H. M." does indeed "open old wounds" when he suggests that many members of professional institutions are content to sit back and take no part in the activities of these associations with which they are connected. A study of the manner in which their activities are organized, particularly in the London area, may give a pointer to the reasons why so many members become apparent "book members."

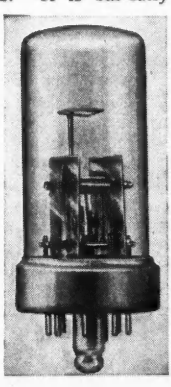
Meetings held at 5.30 p.m., tea at 5 p.m., may be very convenient for engineers working in Central London and others whose frequent early departure from their offices may not be remarkable but, I feel certain, there must be hundreds of engineers in Greater London who cannot regularly attend these functions in time to hear all the proceedings.

The constant necessity of adopting the "tip-toe technique" of joining a meeting perforce induces a "back-seat" mentality which requires a great deal of determination to overcome. The most regrettable feature of this is that the more junior members are affected by these arrangements; yet they are the members of an association who should be given the utmost encouragement to participate in all activities.

Ilford. R. JOHN DAVIES.

Measurement of Acceleration

THE accurate measurement and recording of acceleration by electronic methods is made possible by an accelerometer tube made by Mullard Electronic Products, Ltd., Century House, Shaftesbury Avenue, London, W.C.2. It is basically similar in construction to an all-glass valve of the loctal type, and has the advantage that it may be mounted in any position, which feature, coupled with a high output and good response at low and zero frequencies, enables it to be used as a low mass pick-up for measuring and recording the acceleration and vibration of high velocity elements.



Mullard accelerometer tube

This DDR100 tube is a double diode, the anodes of which are elastically supported so that the impedances thereof vary when the device is subjected to acceleration. In practice, the tube is rigidly clamped to the structure under test and the measurement is expressed in terms of a current change in a Wheatstone bridge circuit, in which the anode/cathode impedance of the accelerometer tube is arranged to form adjacent arms.

The frequency range over which the response to a sinusoidal acceleration can be considered independent of frequency is 0 to 250 c/s. The resonant frequency is 1 kc/s and the maximum acceleration range is 100 g. The tube is designed for a heater voltage of 6.3 V and a maximum anode voltage of 10 V. The output is sufficient for recording directly on a low impedance galvanometer or micrometer, but where necessary it may be fed into an amplifier and cathode-ray oscilloscope, in which case the sensitivity will be 7.5 mV/g.

Electricity Output

THE Ministry of Fuel and Power statement for the week ended 24th December, 1948, shows that 996.9 million kWh was sent out for public supply from solid fuel-fired stations, as compared with 949.5 million kWh in the preceding week and 820.1 million in the week ended 26th December, 1947. Stocks of coal at electricity undertakings at 25th December amounted to 4,130,900 tons, compared with the 4,215,000 tons which was recorded for the previous week.

Views on the News

By REFLECTOR

IT is a great pity that adults were not encouraged to attend Dr. P. Dunsheath's two lectures to children at the I.E.E. last week for obviously they were great fun. He had a great variety of apparatus and models and combined drama with amusement. To demonstrate frequency he played "Good King Wenceslas" on circular saws and he also showed the beautiful structure of some forms of power station emissions—not visible to the naked eye of inhabitants living near the stations. In the second lecture he played with arcs and the heating of wires and nails and crowned his versatile exposition by distributing mince pies, warmed up by h.f., to his young listeners. I feel that a repeat performance for older people is called for.

★ ★ ★

To assist in choosing a title for its new magazine, the South-West Scotland Electricity Board organized a competition which produced 286 suggestions. Of the variety of names put forward, "Contact" was the most popular (eight competitors). This was the title of the house journal of the former Central London Electricity, Ltd., group, which came into being when the six separate companies were amalgamated. Whether it is to be carried on by the London Board I do not know. "Contact" is also the name of the Merseyside and North Wales Board's new magazine. In the circumstances the selection committee did not feel that it could use the designation and made the happy choice of commemorating a pioneer of electrical science long associated with Glasgow by calling the new magazine "The Kelvin."

★ ★ ★

Just before Christmas I commended the enterprise of a well-known electrical firm firm in producing a handsome booket containing suggestions for electrical presents. This was private enterprise, but I now find that there was also public enterprise in this direction. The Eastern Electricity Board inserted in newspapers circulating in its area during December an advertisement advocating electrical Christmas gifts, although in this case only the lower-wattage appliances were mentioned. There was a reminder of the need for economy during peak hours, but it was pointed out that the appliances suggested as presents would have very little effect on the peak. This was one of a series of Press advertisements which the Board is using; most of them call for domestic economy to ensure sufficient power for industry.

★ ★ ★

I noticed in the New Year Honours List an award to a gentleman described as chief paper keeper in a Government Department. No doubt the keeping of papers is important in his case, but there are too many people who keep paper without sufficient reason. It is to such people that the Waste Paper Recovery Association addresses its regular appeals. The necessity for passing the waste paper to the mills is as great as ever, but I see that the Association says that there has been a tendency for the collection to decline in the past month or two. Every individual, firm and company in the electrical industry should be waste-paper conscious and arrange to collect all unwanted paper.

★ ★ ★

At an inquest last week on a woman who died from burns when her nightdress was set alight by an electric fire, Mr. L. F. Beccle, the Essex Coroner, criticized the lack of protection afforded by the metal strip in front of the fire, and indicated that he proposed to take the matter up with manufacturers. Whilst I am in sympathy with any move which will improve the safety of electrical appliances, it seems hardly fair to single out electric fires for criticism when the danger from solid fuel and gas fires is as great if not greater.

★ ★ ★

A heading in the *Daily Worker* "Electricians Make Drug Houses Pay" conjures up visions of wiremen running opium dens. It is something of an anticlimax to find that it merely relates to a wage increase secured by men employed by British Drug Houses, Ltd.

New Year Honours

AWARDS TO ELECTRICAL MEN

THE New Year Honours List, published on Saturday last, includes a number of men well known in the electrical and allied industries. Prominent among these are **Mr. J. Hacking,** M.I.E.E., deputy chairman, British Electricity Authority; **Mr. A. J. Gill,** M.I.E.E., Assistant Director-General (Engineering), G.P.O.; **Dr. H. L. Guy,** C.B.E., D.Sc., M.Inst.C.E., F.R.S., who is chairman of the Mechanical Engineering Research Organization, Department of Scientific and Industrial Research, and secretary of the Institution of Mechanical Engineers, and **Mr. A. A. Saunders,** O.B.E., lately Co-ordinator of Building Supplies, Ministry of Health, all of whom have had knighthoods conferred upon them. **Sir Henry Tizard,** K.C.B., A.F.C., F.R.S., well known for his work on atomic research, chairman of the Defence Research Policy Committee, Ministry of Defence, and president for 1948 of the British Association, becomes a G.C.B., and **Major-General Sir Harold A. Wernher,** Bt., K.C.V.O., T.D., chairman of Electrolux, Ltd., is promoted G.C.V.O.

Mr. J. Hacking

Mr. A. J. Gill

Dr. H. L. Guy

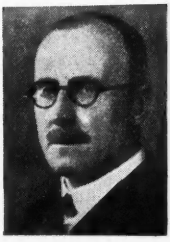
In the list of those who have been awarded the C.B.E., are **Mr. R. E. J. Moore,** M.B.E., assistant secretary, Board of Trade, and London Director of the British Industries Fair; **Prof. F. H. Newman,** D.Sc., Ph.D., A.M.I.E.E., University College, Exeter; **Lt.-Col. E. H. E. Woodward,** M.C., T.D., M.I.E.E., member, British Electricity Authority; **Mr. R. T. B. Wynn,** M.I.E.E., assistant chief engineer, British Broadcasting Corporation; and **Mr. I. G. Evans,** assistant secretary, Department of Scientific and Industrial Research. The C.B.E. (Military Division) has been awarded to **Colonel (temporary) H. L. Lendrum,** A.M.I.E.E., Royal Engineers.

The O.B.E. has been conferred upon **Mr. J. A. Lee,** M.I.E.E., A.M.I.Mech.E., construction (transmission) engineer, British Electricity Authority; **Mr. J. Morgan** M.I.E.E., chief regional engineer, Welsh and Border Counties Region, G.P.O.; **Mr. I. D. MacLennan,** chief electrical engineer, Public Works Department, Sierra Leone; and **Comdr. S. A. Gammon,** lately of cable ships, Cable & Wireless, Ltd.

The award of M.B.E. has been made to **Mr. H. J. Allies,** M.M., engineer, North-Eastern Region, G.P.O.; **Mr. J. Arnold,** works production manager, Dubilier Condenser Co. (1925), Ltd.; **Mr. W. Buchanan,** chief production engineer, G. & J. Weir, Ltd.; **Mr. C. A. Gutsell,** chief designer, Elliott Bros. (London), Ltd.; **Mr. A. Kilgour,** A.M.I.E.E., assistant telephone manager, Glasgow, G.P.O.; **Mr. E. L. Morland,** M.I.E.E., sub-area engineer, No. 1 Sub-Area, Merseyside and North Wales Electri-

Mr. R. T. B. Wynn

Sir Henry Tizard



Lt.-Col. E. H. E. Woodward

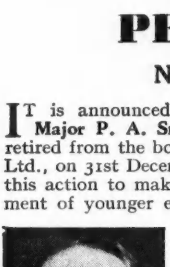
Mr. C. A. Gutsell

city Board; **Mr. W. Ross,** M.I.E.E., senior executive officer, South-West Scotland Division, B.E.A.; **Mr. R. J. Silver,** chief inspector, Rist's Wires & Cables, Ltd.; **Mr. E. Waldron,** A.M.I.E.E., electrical engineer, Admiralty; **Mr. R. J. Willis,** apparatus works engineer, Siemens Bros. & Co., Ltd.; **Mr. A. E. Cheal,** Colonial Postal Service, Engineer, Posts and Telegraphs Department, Nigeria; and **Mr. G. C. Ibbott,** chief test engineer, W. H. Allen, Sons & Co. Among those to whom the British Empire Medal has been awarded are **Mr. L. Benson,** auxiliary plant attendant, Darlington power station; **Mr. T. Burton,** turbine driver, S.W. Scotland Division, B.E.A. (Glasgow); **Mr. L. W. Laws,** fitter and erector, Davey, Paxman & Co., Ltd.; **Mr. W. F. Macdonald,** battery fitter, West Ham power station; **Mr. F. Pell,** outside ganger, Bankside power station; **Mr. H. Westover,** labourer, S.E. Division, B.E.A.; **Mr. G. T. Wisdom,** senior chargehand, S. Wales Electricity Board; **Mr. F. W. Haynes,** works electrician, Docker Brothers, Nottingham; and **Mr. L. A. Moncrieff,** experimental officer, Telecommunications Research Establishment, Ministry of Supply, Malvern.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IT is announced by the company that **Major P. A. Smith,** O.B.E., M.I.E.E., retired from the board of Drake & Gorham, Ltd., on 31st December last. He has taken this action to make room for the advancement of younger executives. Major Smith joined the staff of Drake & Gorham, Ltd., from the Admiralty in 1919 commencing as superintending engineer, and was later appointed chief engineer of the company and manager of the London Contracts Department, where he was responsible, among other important contracts, for the installation in the Bank of England. He was elected to the board in 1932, and whilst remaining on the Drake & Gorham board as technical director finally transferred his activities to the manufacturing side of the business as managing director of a subsidiary company, which position he held at the time of his retirement. As a mark of appreciation, he was presented by the directors, staff and principal operatives of both companies with an engraved silver cigarette case and a telescope. Before joining the company, Major Smith, after his initial training in civil and military engineering, was for some years at sea in an engineering capacity. He also had experience as a branch manager with a firm engaged on ship installation work, including plant and contracting work generally, and was for two years assistant engineer with the County of London Electric Supply Co., Ltd.



Major P. A. Smith

During the 1914-18 war, Major Smith was awarded the O.B.E. (Military Division) for services in connection with electrically controlled minefields.

Mr. A. J. Allport has been appointed advertising manager to the Tube Investments subsidiary, Simplex Electric Co., Ltd., Oldbury, Birmingham.

Mr. R. Keenlyside has been appointed engineer (operation and maintenance) to the Forest District, N.E. Sub-Area, London Electricity Board. Mr. Keenlyside leaves the position of assistant district superintendent at West Ham, and had previously held positions with the Walthamstow and Sunderland municipal electricity supply undertakings.

Mr. J. W. Smith, A.M.I.E.E., of West Ham, formerly of Colchester Electricity Department and the R.N.V.R., has been appointed district superintendent at West Ham in succession to Mr. Keenlyside.

Mr. R. W. Storey, Associate I.E.E., A.I.I.A., F.R.S.A., has been appointed deputy sales manager of the Brush Electrical Engineering Co., Ltd. Mr. Storey received his early training with W. J. Furse and Co., Ltd., and Ferguson Pailin, Ltd. Before the last war he was engaged on power station construction for New Consolidated Goldfields, Ltd., of South Africa, and during the war held an appointment in the Station Design and Installation Department of the British Broadcasting Corporation. Subsequently he joined the Plant Sales Division of Crompton Parkinson, Ltd. Mr. Storey took up his duties with the Brush Co. last month.

Mr. R. W. Storey

Mr. L. Richardson, A.M.Inst.C.E., chief reconstruction engineer to the city engineer, Plymouth, has been appointed assistant civil engineer to the generation engineer (construction) of the British Electricity Authority, South-Western Division. Mr. Richardson, who went to Plymouth as senior assistant and served as chief engineering assistant during the war, was appointed chief reconstruction assistant in 1944.

Mr. J. S. Hayes, formerly resident engineer and manager to the Settle and District Electricity Co., Ltd., has been appointed district consumers' engineer, Western District in No. 5 Sub-Area of the North-Western Electricity Board, which includes the former Blackburn, Accrington and Darwen undertakings. Before joining the Settle Co. Mr. Hayes was with the Bradford Corporation Electricity Department.

Mr. R. H. Collingham, M.Inst.C.E., M.I.Mech.E., relinquished the position of chief turbine engineer with the British Thomson-Houston Co., Ltd., on 31st December, but is continuing his association with the company as consultant on technical design problems. Mr. Collingham, who was born in Hull and educated at Hymers College, received his early technical training at Lincoln Technical College, whilst serving an apprenticeship with Robey & Co. He joined the B.T.H. Test Department in 1905 and was ultimately in charge of the Turbine Test Section and chief assistant to the head of the Department. In 1908 he transferred to the Turbine Engineering Department to found the section dealing with exhausters, blowers and compressors, and was responsible for all the original designs of this class of machinery. Later he extended his activities to include all aspects of turbine design, and was appointed chief assistant to the late Mr. F. Samuelson in 1925, and chief turbine engineer in 1939.

Mr. R. H. Collingham

Mr. P. D. Morris

Mr. S. A. Couling

The recent rapid development in B.T.H. design of all kind of turbine machinery is due in large measure to Mr. Collingham's work. One notable example is the extra-high-temperature 10,000 kW turbo-alternator which was designed and built by B.T.H. Co. for the Detroit Edison Company, U.S.A., and installed in 1929. This turbine, operating at 1,000 deg F. inlet temperature, was an important advance on previous steam turbine practice, and it led to the close association between Mr. Collingham and Air Commodore Sir Frank Whittle which resulted in the practical development of the Whittle gas turbine jet engine.

Consequent on the retirement of Mr. Collingham, **Mr. K. R. Hopkirk,** M.A., assistant chief mechanical engineer, assumes responsibility for turbine and gearing design and engineering for the B.T.H. Co. **Mr. P. D. Morris,** A.M.I.Mech.E., is appointed chief turbine engineer and **Mr. S. A. Couling,** A.M.Inst.C.E., A.M.I.Mech.E., chief gear engineer.

Mr. Morris was apprenticed with Belliss & Morcom, Ltd., and received his technical training at the Central Technical College, Birmingham. He remained with Bellis & Morcom on steam turbine work until 1924, when he joined the B.T.H. Co. He entered the Turbine Engineering Department in 1927 and has been chief assistant in that department since 1939. Mr. Morris is, perhaps, best known for his exhaustive work on turbine governing. He has travelled in a consultative capacity on behalf of the company in Australia, Canada, the U.S.A. and Europe.

Mr. Couling received his technical training at Bedford Technical Institution. He served an apprenticeship with W. H. Allen, Sons & Co., Ltd., worked in the drawing office, and served as assistant to the chief engineer. He joined the B.T.H. Turbine Engineering Department in 1925, and specialized in the development of gearing. One of his outstanding achievements was the design of the 3,000 s.h.p. 5,050/200 r.p.m. geared turbine propeller drives with locked-train double-reduction gearing for Admiralty frigates. For his paper on "High Speed Helical Gearing," read before the Institution of Mechanical Engineers in 1943, Mr. Couling was awarded the Thomas Lowe Gray prize for that year.

Mr. T. Riley, executive officer for the Burnley and Padiham area, and former borough electrical engineer of Burnley, retired on 31st December after forty-two

years' service with the Burnley electricity undertaking. He is a former chairman of the northern division of the Electrical Power Engineers' Association and at one time served on the National Executive Council.

Mr. R. Fyfe, who two years ago was appointed successor to Mr. C. W. Saddington as burgh electrical engineer at Oban and later became Oban area manager under the North of Scotland Hydro-Electric Board, has been appointed lecturer at the Board's Staff College at Pitlochry. He will be succeeded as area manager by **Mr. M. J. Keane,** area manager for Kyle of Lochalsh.

Mr. A. W. A. Dick-Cleland, B.Sc., A.R.T.C., M.I.E.E., A.M.I.I.A., has been appointed a director of Lancashire Dynamo and Crypto, Ltd., as from 1st Jaanuary. Mr. Dick-Cleland, who joined the London sales staff in 1946, was appointed general manager of the Trafford Park works in March, 1947. After graduating B.Sc. at Glasgow University and obtaining the associateship of the Royal Technical College, Glasgow, he served his appreticeship with Fraser & Borthwick, Ltd. He gained experience as a designer with the Harland Engineering Co., Ltd., Alloa, and the General Electric Co., Ltd., Witton, and was later appointed Scottish manager by Newman Industries, Ltd.

Mr. A. W. A. Dick-Cleland

Mr. Dick-Cleland was a volunteer of the R.N.V.S.R. before the war and was commissioned as a sub-lieut. in the Electrical Branch of the R.N.V.R. in 1939, reaching the rank of electrical commander in 1944. After two and a half years' service afloat he held an appointment in the Admiralty in charge of the electrical equipment in Coastal Force Craft and acted as chairman of the Admiralty Committee dealing with radio interference suppression.

Mr. H. D. Parsons, the honorary secretary of the Ex. J. & P. Association, informs us that his new address is "Heigham," 20, Beaumont Road, Orpington, Kent.

Mr. G. K. Stott has been appointed general manager of the General Electric Co. (Burma), Ltd., as from 1st December last, in succession to **Mr. J. Paxton,** who will shortly be joining the G.E.C. organization at home. Mr. Stott, a native of Aberdeen, began his career in the G.E.C. at the company's Aberdeen branch, and subsequently spent twenty years in India, moving from Calcutta to Bombay and Lahore when he was appointed manager in 1942.

Changes in organization announced by London Transport include **Mr. F. A. A. Menzler,** chief development and research officer, who will assume administrative responsibility for the Central Laboratory (previously known as the Chemical Laboratory, Chiswick) and the three generating station laboratories.

Mr. J. Thomas, Associate I.E.E., a member of the staff of James Scott & Co. (Electrical Engineers), Ltd., Dunfermline, has accepted a post as cable contract engineer with Scottish Cables, Ltd.

Mr. W. M. B. Veitch, M.I.E.E., has been appointed deputy chief engineer of the New Zealand General Post Office from the position of superintending engineer. **Mr. D. Donaldson,** B.Sc., A.M.I.E.E., district engineer, Dunedin, has been appointed superintending engineer (field).

The directors of **the Telegraph Construction and Maintenance Co., Ltd.** entertained their head office staff at an informal luncheon on 23rd December at Pimms in Bishopsgate. Mr. G. L. Lawford (secretary of the company), thanked the directors on behalf of the staff, and Sir Geoffrey Clarke (managing director) expressed his appreciation of the work done by the staff during 1948. Mr. J. N. Dean, one of the "guest" directors from Telcon works, made his acknowledgments and proposed a toast to the health of Sir Geoffrey. Other directors present were Mr. B. H. Musgrave, Mr. W. F. Randall and Dr. E. W. Smith (Submarine Cables, Ltd.), and the works manager, Mr. F. Leighton.

The **Lancashire Dynamo & Crypto, Ltd.,** Social and Athletic Club recently held its annual children's Christmas party when over 400 children attended. This year the entertainment took the form of cartoon films, a ventriloquial act and a special children's sketch given by members of the Armature Dept. Father Christmas (Mr. H. P. Pentelow) distributed presents and each child received a gift of fruit before leaving. The director and general manager of the Trafford Park Works, Mr. A. W. A. Dick-Cleland, and Mrs. Dick-Cleland were present.

The annual dinner of the South Midland Centre of the **Institution of Electrical Engineers** will be held on 4th February at the Grand Hotel, Birmingham. Applications for tickets (18s 6d each), together with remittance, should be made by 19th January, either to Mr. H. Hooper, hon. secretary, c/o. B.E.A., 53, Wake Green Road, Moseley, Birmingham, or Mr. W. J. Bird, assistant hon. secretary, c/o General Electric Co., Ltd., 125, Moor Street, Birmingham.

The directors and staff of the **British Central Electrical Co., Ltd.,** held their annual dinner at the Eccleston Hotel, London, on 23rd December after seeing the play "Worm's Eye View." Flowers were presented to Mrs. Conradi on behalf of the staff by Mrs. Lloyd, secretary, Mrs. Conradi suitably replying. Mr. G. Conradi thanked all members of the staff for their loyal service during 1948.

Obituary

Lt.-Col. S. M. Tate.—The death occurred on 23rd December at the age of sixty-one of Lt.-Col. Simon Marshall Tate, assistant managing director of Tube Investments, Ltd.

Mr. W. B. Smith.—The death occurred on 27th December of Mr. William Brownhill Smith, M.V.O., O.B.E., D.I., a founder of the Smoke Abatement League (now the Smoke Abatement Society).

Wills

Mr. S. E. Garcke, C.B.E., M.I.Mech.E., chairman, Electrical Press, Ltd., Electric & General Investment Co., Ltd., and a director of other companies, who died on 3rd October last, left £258,628 gross (£246,934 net).

Mr. H. A. Spreadbury, chairman of Z Electric Lamp & Supplies Co., Ltd., who died on September 3rd last, left £25,744 gross (£25,356 net).

Mr. R. Tweedy Smith, LL.D., late chairman of the Sun Electrical Co., Ltd., and a director of the Rawlplug Co., Ltd., and other companies, who died on 18th May last, left £91,973 gross (£79,006 net).

Mr. G. H. Congdon, A.M.I.E.E., late managing director of Etchells, Congdon & Muir, Ltd., who died on 1st August last, left £22,309 gross (£22,031 net).

Mr. C. R. Bolton, M.Eng. A.M.I.E.E., liaison officer at Prescot with British Insulated Callender's Cables, Ltd., who died on 28th August last, left £18,879 gross (£18,761 net).

Sir Arthur Whitten Brown, K.B.E., M.I.E.E., D.L., manager of the Metropolitan-Vickers Electrical Co.'s Swansea office, who died on 4th October last, left £5,002 gross (£4,800 net).

Mr. W. M. Ratcliffe, J.P., M.I.Mech.E., joint managing director of Heenan & Froude, Ltd., and a director of other companies, who died on 6th August last, left £70,441 gross (£47,547 net).

Dr. A. F. C. Pollard, A.M.I.E.E., Professor Emeritus of the Imperial College of Science and Technology, South Kensington, and for a time on the technical staff of Siemens, who died on 15th August last, left £10,805 gross (£10,671 net).

Nuclear Power Problems

SEVEN lectures on Thursday afternoons, beginning on 20th January, will be delivered on the subject of "Scientific and Engineering Problems of Nuclear Power (Atomic Energy)," at the Electrical Engineering Department of the Imperial College of Science and Technology, South Kensington, London.

The lecturers will be Mr. O. Buneman, Ph.D., and Mr. J. Diamond, M.Sc., Wh.Sc., A.M.I.Mech.E., of the Ministry of Supply's Atomic Energy Research Establishment, Harwell, Berks. Their lectures, commencing at 3.45 p.m., will deal with supply and demand of nuclear fuel, general features of fission reactors, deleterious effects associated with nuclear reactors, heat removal and utilization, constructional aspects of reactors, control and instrumentation of reactors, and a summary.

To suitable students of the Imperial College, and to Inter-Collegiate students admission to the lectures will be free; otherwise a charge of 31s 6d will be made for the course, and those wishing to attend are asked to apply to the Deputy Registrar, City and Guilds College, Exhibition Road, S.W.7.

Sabotage Charge

WE reported in our issue of 24th December that Albert R. C. Vowles who had been employed at Portishead power station, had been committed for trial on charges of malicious damage and the theft of two coupling bolts. It was stated in evidence that a damper door at the Portishead station had been removed and that metal filings had been placed in the bearings of a boiler feed pump. Later it was found that a number of coupling bolts were missing from the feed pumps and some of them had been found concealed in pipework at the station.

When Vowles appeared at the Bristol Quarter Sessions on 4th January he pleaded "Not guilty" to a charge of attempting to damage a generator and "Guilty" to a charge of stealing two coupling bolts. He was found "Guilty" on the attempted damage charge and sentenced to twelve months' imprisonment.

E.R.A. Luncheon

THE annual luncheon of the British Electrical and Allied Industries' Research Association will be held on 11th February at the Connaught Rooms, Great Queen Street, London, W.C.2, and will be preceded by the annual general meeting.

NEW BOOKS

Electrical Measurements in Theory and Application. By A. W. Smith. Pp. 371; figs. 250; index (fourth edition). McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Price 25s 6d in U.K.

This is an American textbook of intermediate standard which deals with electrical measurements from the laboratory rather than from the industrial standpoint. The author has been more concerned to explain underlying principles than to give detailed practical directions. A firm foundation is laid in the opening chapter where there is an excellent account of electrical units explained with reference to their connection with the MKS dynamical units, and of basic principles. Here it is welcome to find an explicit and exact statement of Ohm's law.

The section on d.c. measurements deals fully with the use of ammeters, voltmeters and the potentiometer; two entire chapters are devoted to the Wheatstone bridge and its applications to fault localization and temperature measurement. The section on magnetic measurements is prefaced with a good account of magnetic units and is planned on conventional lines. Similarly, the section on a.c. testing starts with a sketch of theory and it is devoted almost entirely to bridge methods of measuring capacitance and inductance. The underlying theory of these tests is explained lucidly by the aid of vector diagrams. The Schering bridge circuit is described in this section, but it is not so designated in the text or referred to in the index.

The book concludes with a short chapter on the calibration of a.c. instruments. Measurements of power, energy and so forth in three-phase circuits fall outside the scope of the book. A knowledge of elementary mathematics up to the rudiments of the calculus suffices for intelligent reading, but, as is often the case with books having an academic bias, the algebraic symbolism sometimes seems to be more complicated than it need be. The book is excellently illustrated and well indexed, and it can be recommended as a trustworthy work on the branch of the subject of electrical measurements with which the author deals.

—G. W. S.

Electrical Tables and Data. Editor, E. Molloy. Pp. 680; figs. 267; index (second edition). George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 10s 6d.

This pocket-sized reference book contains a wealth of data relating primarily to the utilization side of the electrical industry. The various tables and data concerning a particular branch, such as wiring and installation work, have been grouped together to facilitate reference. In this new edition over eighty pages of new material have been incorporated dealing with the more recently developed insulating materials, the properties of metals and carbon brushes, improvements in motor starting and control gear, and the latest types of fluorescent lamps. Two other noteworthy features are the considerably enlarged list of British Standard Specifications and the index containing nearly 3,000 entries.—R. P.

Books Received

Fractional Horse-Power Electric Motors. By E. K. Bottle, B.Sc., A.M.I.E.E. Pp. 209; figs. 109; index. Charles Griffin & Co., Ltd., 42, Drury Lane, London, W.C. 2. Price 15s.

Physical Aspects of Colour. By Dr. P. J. Bouma. Pp. 312; figs. 312; index. Cleaver-Hume Press, Ltd., 42a, South Audley Street, W.1. Price 30s.

The Steel Industry and Nationalization. By J. H. Jones, M.A., LL.D. Pp. 32. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 1s.

The Story of Power. By G. Gerard, A.M.I.E.E. Pp. 107; figs., illus. and index. Thomas Nelson & Sons, Ltd., 3, Henrietta Street, London, W.C.2. Price 5s.

Staff Magazines

TWO new staff magazines of Area Electricity Boards have recently made their appearance. That of the Eastern Board is published in six editions for the different Sub-Areas, the first twelve pages being common to all. Each of the Sub-Area sections — the "Finborough Review," "Fens Review," etc.—has its own distinctive appearance. The magazine is brightly produced and informative.

"The Kelvin" is the name chosen for the staff magazine of the South-West Scotland Electricity Board. The first issue contains a diversity of interesting notes and comments. The portraits of members of the Board are reproduced and in a section "Contemporaries" the oldest members of the staff of each Sub-Area are introduced.

Contents of the first issue of "Contact," the magazine of the Merseyside and North Wales Board, include portraits of members, snapshots of places and personalities in the area, a section for the ladies, an amusing story "The Much Tottering Power Company" by R. B. Leeming, and news from the Sub-Areas.

Electricity in the '49s

Some Noteworthy Centenaries

By G. J. S. KING

THE celebrities whose centenaries we commemorate year by year are usually bygone notabilities who are merely names in history rather than a personal memory. This cannot be said of Sir John Ambrose Fleming, for it is less than four years since his death. Yet he was born as long ago as 29th November, 1849.

It was in the 'seventies that Fleming's "New Contact Theory of the Galvanic Cell" was read before the Physical Society of London; and in the early 'eighties he became electrical engineer to the Edison Electric Lighting Company. He was for over forty years Professor of Electrical Engineering at University College, and was adviser and consulting engineer to many electric lighting companies and corporations, taking an active part in the introduction of incandescent electric lighting into England, and being the author of numerous works on electrical subjects. He was also concerned with the development of the telephone, and of wireless telegraphy, and will be remembered in particular as the inventor of the thermionic valve, which made radio-telephony possible.

Early Two-part Tariff System

It is difficult to realize that John Hopkinson was also born in 1849 (on 27th July), for whereas Fleming was with us so recently it is over half a century since the premature death of Hopkinson, in an Alpine climbing disaster. He had been appointed, in 1890, Professor of Electrical Engineering at King's College and in the following year was appointed adviser and consulting engineer to the Manchester Corporation, in connection with the electric lighting of that city. It was at Manchester that he introduced the system of making the customer pay "a charge calculated partly by the quantity of energy contained in the supply, and partly by a yearly or other rental, depending upon the maximum strength of the current to be supplied." He had, during the 'seventies, experimented on the residual charge of the Leyden jar, and on the electrostatic capacity of glass (on the advice of Kelvin), and in 1882 took out his patent for the three-wire system of distributing electricity. In the 'eighties he directed his attention to the improvement of dynamos, and introduced the series-parallel system for motors.

Electric Traction Pioneers

Sir Robert William Perks, who was born on 24th April, 1849, will be remembered by as wide a circle as Sir Ambrose Fleming. He was chairman of the Metropolitan District Railway during its conversion from steam to electricity. Sir Clifton Robinson, who was born on 1st January in the same year, was concerned in his youth with the first tramway in Europe (at Birkenhead, his birthplace). He subsequently pioneered electric traction in London, and constructed the first electric tramway at Bristol and in other provincial cities. He was also actively associated with the development of London's Tube network and was responsible for the pioneer system of cable and electric tramways at Los Angeles.

James Douglas Hamilton Dickson, who was born on 1st May, 1849, was Kelvin's assistant in the 'sixties, and was not only concerned in perfecting Kelvin's siphon recorder, but in "the construction of the apparatus and the preliminary experiments for Kelvin's determination of v, the ratio of the electromagnetic to the electrostatic unit of electricity."

Joseph William Willmot (born 13th April, 1849) began his career with the Electric and International Telegraph Company, and was subsequently engaged in the development of the pneumatic tube system, his improvements in pneumatics including a double sluice pneumatic valve and a quick-break electric light switch, while he was also responsible for various inventions connected with the Wheatstone system of automatic telegraphy.

Among other notabilities born in 1849 were Arthur Bromley Holmes, a founder of the Liverpool Electric Supply Company and of the Birmingham Electric Supply Company and for some years Liverpool's city electrical engineer; George Forbes, who was electrical engineer for the works at Niagara Falls and author of "Lectures on Electricity" and "Alternating and Interrupted Electric Currents"; Robert Edward Baynes, examiner in electricity and magnetism at South Kensington; and Sir Horace Lamb, who was author of "Hydrodynamics," and of various papers on elasticity and electro-magnetism. The obituaries of 1849 included (12th September) William Cooke Taylor, whose numerous writings included an "Account of the Electro-magnet Engine."

It was in 1849 that Faraday concluded his three years' investigations into the subject of diamagnetism. Towards the end of that year Rankine sent to the Royal Society of Edinburgh his famous paper "On a Formula for Calculating the Expansion of Liquids by Heat"; and Kelvin (then Professor Thomson) communicated to the same Society that year the first of his papers on thermodynamics, which took the form of a critical account of Carnot's theory of the motive power of heat. Meanwhile, on 21st January, Kelvin's friend, James Prescott Joule, concluded his epoch-making experiments into the mechanical equivalent of heat in a paper read before the Royal Society.

Arc Lamp Demonstration

On "various nights" during 1849 that famous electrician, William Petrie, demonstrated the first truly self-regulating arc lamp from the old Hungerford suspension bridge, in the presence of a band of distinguished scientists, including Sir Charles Wheatstone. On 10th January the practicability of submarine telegraphy was proved when Charles Vincent Walker sent a message to London from a ship two miles off Folkestone. In the same year Walker assisted the Astronomer-Royal to introduce a system of time signals, which were transmitted from Greenwich by means of telegraph wires to various local centres; and the twelfth edition of Walker's "Electrotype Manipulation" was published that year.

Another publication of 1849 was the "Handbuch des Erdmagnetismus" of Johann von Lamont, an authority on the earth's magnetism. Georg Simon Ohm was appointed in 1849 Professor of Physics in the University of Munich and Helmholtz became in that year Professor of Physiology at Königsberg. That great electrician, William Sturgeon, who had already received from the Government a grant of £200, had this supplemented in 1849 by an annuity of £50.

Armand Fizeau, the French physicist, invented in 1849 a method of determining the speed of light, a year before measuring that of electricity. It was a year of rehabilitation for Wilhelm Eduard Weber (who propounded the law of forces between charges, and invented a system of electro-magnetic telegraphy) for he was allowed to return to Hanover, from which he had been banished for political activities twelve years earlier.

Eighteenth Century Experimenters

In the year 1749 the famous natural philosopher, Tiberius Cavallo, was born at Naples. Cavallo invented various pieces of apparatus for electrical experiments, and in 1786 published his "Complete Treatise on Electricity." He had long since settled in Britain, and his first publication had been "Extraordinary Electricity of the Atmosphere observed at Islington," which was reprinted in Sturgeon's "Annals of Electricity." In his later career Cavallo became interested in the use of electricity as a curative agent, publishing a work "On Medical Electricity." He was also author of "A Treatise on Magnetism in Theory and Practice" and of a paper "On the Multiplier of Electricity."

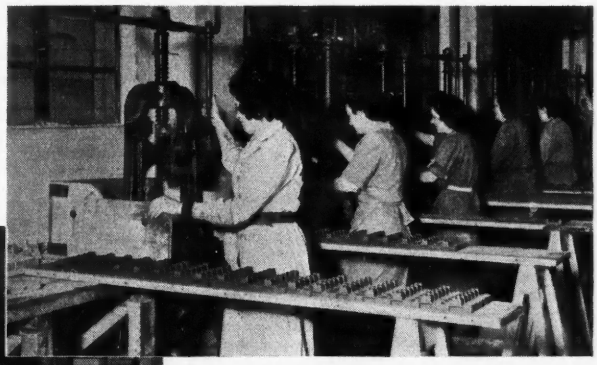
John Canton, who was the first electrician to demonstrate that air is capable of receiving electricity by communication, the first to make powerful artificial magnets, and the first Englishman to repeat Benjamin Franklin's experiments on the subject of lightning, was elected in 1749 a Fellow of the Royal Society. Mention of Franklin recalls that it was in 1749 that he invented the lightning conductor. Another pioneer active in the year 1749 was Sir William Watson, who was described by Priestley as "the most interested and active person in the kingdom in everything relating to electricity."

Electrical Porcelains

NEW FACTORY OPENED IN LONDON

THE recent establishment at Cricklewood of a factory for the manufacture of all types of electrical porcelains and refractories will be of particular convenience to electrical manufacturers in the London district, where hitherto no such facilities have been available. At Metrum Works, Edgware Road, North London Ceramics, Ltd., have now installed the most modern type of plant, including a 92ft-long continuous-tunnel kiln.

Fuse carriers and bases, porcelains for switches, connectors, etc., cooker and fire refractories are among the articles which are already being made for well-known firms. At the moment between fifty and sixty hand presses are in use and further presses are being put into operation at the rate of about two a week. The presses, dies and much of the other plant employed in the factory are all produced in the company's own well-equipped tool room.



Pressing out fuse bases, and (left) a truck leaving the continuous kiln after firing

The raw material, after being mixed and brought to paste form, is first passed through an infra-red drying plant to reduce the moisture content to 17 per cent. It then goes to a grinding plant which crushes it to a fine powder ready for use. Leaving the presses, the formed articles spend a short time in a "greenhouse," a room in which the temperature is maintained at approximately 120 deg F.

Fettling removes unwanted material and generally cleans up the articles, which then go to another greenhouse. From here they either go straight to the tunnel kiln for firing or are first sprayed to impart the glaze. Where two firings are given the glaze is applied after the first, when the porcelain is in the "biscuit" stage. The kiln operates at a maximum temperature of 1,220 deg C and has a firing cycle of 44-48 hours. Sixteen trucks can be accommodated at once so that one is admitted and one removed on an average every 2¾ hours.

Arrangements have been made to take over an adjoining factory when expansion of production makes it necessary.

New Zealand Imports

DURING the first half of 1948 electrical imports into New Zealand were about 40 per cent in value above those of the first six months of the previous year. Details so far available are given in the following table:—

Class	First half 1947	First half 1948
	£	£
Storage batteries	18,000	21,600
Ranges	—	1,300
Lamp bulbs	36,000	69,800
Other elec. machinery and equipment	2,927,000	4,076,000
Radio sets	8,500	3,600
Radio valves	69,700	52,500
Other radio apparatus ...	98,000	178,800

Next Week's Events

Monday, 10th January

BIRMINGHAM.—Imperial Hotel, 6 p.m. I.E.E. South Midland Supply and Utilization Group. "The Application of Electricity to Horticulture," by C. A. Cameron Brown and E. W. Golding.

CARDIFF.—At the South Wales Institute of Engineers, 5 p.m. I.E.E. Western Centre. "A Résumé of V.H.F. Point-to-Point Communication," by F. Hollinghurst and C. W. Sowton.

LONDON.—Savoy Place, 7 p.m. I.E.E. London Students' Section. "Electrical Methods of Recording Transient Pressures," by M. T. Cree.

South-East London Technical College, 8 p.m. A.S.E.E. South-East London Branch. "The Man and His Job. No. 3—The Consumer's Engineer," by A. E. Marlow.

NEWCASTLE-ON-TYNE. — Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "Factors Influencing the Design of High-Voltage Air-Blast Circuit Breakers," by C. H. Flurscheim and E. L. L'Estrange.

NOTTINGHAM.—Corporation Gas Showrooms, 6.30 p.m. Nottingham Society of Engineers. "The Use of Electricity on Board Ship for Propulsion and Auxiliary Services," by E. L. N. Towle.

STAFFORD. — King Edward Grammar School, 7 p.m. I.E.E. North Staffordshire Sub-Centre. "Some Projects Favourable to Direct-Current Transmission, and the Role of the British Electrical Industry in Relation Thereto," by F. J. Erroll and Lord Forrester.

Tuesday, 11th January

BELFAST.—Queen's University, 6.45 p.m. I.E.E. Northern Ireland Centre. "The Application of Electricity to Horticulture," by C. A. Cameron Brown and E. W. Golding.

CAMBRIDGE. — Cambridgeshire Technical College, 6 p.m. I.E.E. Cambridge Radio Group. "The Testing of Communication-Type Receivers," by W. J. Bray and W. R. H. Lowry.

LEEDS. — Yorkshire Electricity Board Offices, 1, Whitehall Road, 6.30 p.m. I.E.E. North Midland Centre. "The Lightning Protection of High-Voltage Transmission and Distribution Systems," by H. M. Lacey.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Joint meeting of I.E.E. Measurements and Radio Sections. "Double-Ratio A.C. Bridges with Inductively Coupled Ratio Arms," by H. A. M. Clark and P. B. Vanderlyn, and "A Direct-Capacitance Aircraft Altimeter," by W. L. Watton and M. E. Pemberton.

LUTON.—Town Hall, 7.30 p.m. Luton Electrical Society. "Power Factor Correction," by E. L. Fairclough.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Supply Group. "The Application of the Recurrent Surge Oscillograph to the Study of Surge Phenomena in Transformers," by E. L. White and W. Nethercot.

WIMBLEDON.—Compton Hall, Compton Road, 7.30 p.m. A.S.E.E. South-West London Branch. "The Case Against Fluorescent Lighting," by G. V. Downer.

Wednesday, 12th January

ABERDEEN.—Caledonian Hotel, 7.30 p.m. I.E.E. North-East Scotland Sub-Centre. "Behaviour of High-Voltage Solid-Type Cable Accessories in Service," by C. J. Armstrong and C. T. W. Sutton.

EDINBURGH. — Heriot-Watt College, 7 p.m. I.E.E. Scottish Centre. "The Design of Large Vertical-Shaft Water-Turbine Driven A.C. Generators," by E. M. Johnson and C. P. Holder.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. "Some Aspects of Design of Balanced Rectifier Modulators for Precision Applications," and "The Effects of an Unwanted Signal mixed with a Carrier Supply of Ring-and-Cowan Modulators," by D. G. Tucker.

Thursday, 13th January

CARDIFF.—At the South Wales Institute of Engineers, 6 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales Branch). "Recent Developments in Providing Safe Control Circuits," by J. Hopley.

DUNDEE.—Royal Hotel, Union Street, 7 p.m. I.E.E. North-East Scotland Sub-Centre. "Behaviour of High-Voltage Solid-Type Cable Accessories in Service," by C. J. Armstrong and C. T. W. Sutton.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. Lecture on "The Medical and Psychological Aspects of Electric Shock, and Some of the Nervous Complications,' by Dr. Macdonald Critchley.

PALMERS GREEN.—St. John's Hall, Hoppers Road, 7.30 p.m. A.S.E.E. North London Branch. "Electric Resistance Welding," by J. R. Bateman.

SWANSEA.—The Guildhall, 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. "The Design, Testing and Calibration of a Combustible-Gas Detector," by R. Poole.

Friday, 14th January

CREWE.—Crewe Arms Hotel, 7 p.m. A.S.E.E. Crewe Branch. "Induction Smelting Furnaces," by C. Osborne.

COMMERCE and INDUSTRY

Gas-Turbine Locomotives: Electricity in Horticulture

THE 2,500 h.p. 90 m.p.h. gas-turbine electric locomotive ordered by the Great Western Railway from Brown-Boveri, Ltd., in 1946 is reaching an advanced stage of manufacture. It is anticipated that it will be delivered to British Railways in July, 1949. Construction of both the power unit and chassis is expected to begin next month, the former at Baden and the latter at Munchenstein. Bench tests of the power unit should take place towards the end of March, and load trials of the complete locomotive on the Swiss Federal Railways in June.

The power unit for the gas-turbine locomotive undertaken by the Metropolitan-Vickers Electrical Co., Ltd., at Manchester in conjunction with British Railways (Western Region) is also in a well-advanced stage of construction and progress has been made with the design of the mechanical parts.

Board of Trade Amalgamation

The Commercial Relations and Treaties Department and the Export Promotion Department of the Board of Trade have been amalgamated into a new department known as the Commercial Relations and Exports Department as from 1st January. No detraction from the functions of either Department is contemplated. The geographical sections will be at I.C. House (telephone: Whitehall 5140) and the Industries Branches and the Reception and Tours Section at Thames House North (telephone: Victoria 9040). The Exhibition Branch will remain at Horseferry House (telephone: Victoria 6800).

Soil-warming Exhibition

An exhibition for amateur gardeners and commercial growers of soil warming and propagating by modern electrical methods was held at the Electricity Service Centre, Edinburgh, from the 14th to 18th December. The exhibition was arranged in conjunction with a paper entitled "The Application of Electricity to Horticulture" given by Mr. C. A. Cameron Brown and Mr. E. W. Golding at a meeting of the I.E.E. Scottish Centre in the Heriot-Watt College on 15th December. A window display featuring scaled models of greenhouses and frames in a colourful floral setting with a painted rural scene in the background attracted much attention before and during the period of the exhibition.

The exhibition itself consisted chiefly of cold frames in which was installed soil-warming equipment. A greenhouse was also fitted up with a propagating bench and a section to show an installation for the growing of early salad crops and tomatoes. Other displays included an electric lawn mower, sterilizing equipment for chrysanthemum stools and strawberry runners, a portable air compressor for spraying insecticides, paint or pumping-up tyres, and various electric pumps. Soldering irons,

Section of the soil-warming exhibition in Edinburgh

electric wall clocks, electric drills, and a bench grinder formed a display of small appliances. In addition to the window display already mentioned and one in the premises of the General Electric Co., Ltd., in George Street, the exhibition was publicized by advertisements in the local Press, by posters throughout the city, and circular letters to horticultural societies and the secretaries of the allotment holders' associations. Talks were given by Mr. Cameron Brown.

Radio Tests on Railways

Tests are to be carried out by the British Railways to determine the possible value of radio for communication between shunting-engine drivers, ground staff and control towers in marshalling yards; between staff during extensive engineering operations; and from a central depot to road cartage

collection and delivery vans. Working trials will take place as soon as the radio equipment now on order becomes available. Tests are also in hand, using ultra high frequency, to determine the possibility of providing radio communication through tunnels, to facilitate engineering operations in these difficult locations.

Diesel-Electric Shunters for Steel Works

The Brush Electrical Engineering Co., Ltd., has received an order from the Steel Company of Wales, Ltd., for four 0-6-0 diesel-electric shunting locomotives for use at the Steel Company's works at Port Talbot. These locomotives have been specially designed to meet the arduous conditions of steel works railway operation. The frame and buffer beams will be of particularly robust construction and roller bearings will be fitted on all axles. The power unit for each locomotive is a Mirrlees "TLS6" six-cylinder diesel engine with a continuous rating of 487 b.h.p. at 710 r.p.m. direct coupled to a Brush 280 kW traction generator supplying current to two nose-suspended Brush traction motors each developing 170 h.p. The locomotives will be erected at the Stafford works of W. G. Bagnall, Ltd. (an associate company), under the supervision of engineers from the Brush Co. The consultants, who are the International Constructional Co., Ltd., acting with McLellan and Partners, recommended diesel-electric locomotives after having considered the relative merits of both diesel-mechanical and diesel-electric transmissions for steel works duties.

"Ekco" Development in India

E. K. Cole, Ltd., and the National Radio & Engineering Co., Ltd., Bombay (a Tata affiliated company), announce that they have entered into an agreement for the establishment and development of radio manufacture and distribution in India. This will embrace radio receivers, components and electronic devices generally. Plans are well advanced for the production of a range of radio receivers. The name of the new company is not yet announced.

Gas Turbines in Germany

The development of gas turbines in Germany during the 1939-45 period is the subject of B.I.O.S. overall report (No. 12) just issued by H.M. Stationery Office at 1s.

It is by Mr. J. W. Adderley, a member of the staff of Power Jets (Research & Developments), Ltd., who shows that the stage reached in Germany at the end of the war was, in general, behind the corresponding development in the U.K. The reasons were mainly shortage of suitable metals and the greater urgency to build aircraft engines than turbines for land and marine power production.

This report reviews projects, design of components, materials, manufacturing methods, test equipment and the administration of developments. Information is given about three sets. The two Holzwarth machines are of historic interest only. The most interesting of all the German schemes is the M.A.N. 12,000 kW turbine designed to burn gas derived from brown coal by reaction between high-pressure air and steam in producers developed by the Lurgi chemical engineering group, but not built. The only gas turbines to reach the production stage in Germany were for aircraft.

E.I.B.A. Northern Counties Area

The annual general meeting of the Northern Counties Area of the Electrical Industries Benevolent Association will be held on 20th January, at 4.0 p.m., at the Royal Station Hotel, Neville Street, Newcastle-upon-Tyne, 1, under the chairmanship of Mr. W. J. H. Grainger.

"Popularity Competition"

A competition is being held by Clang, Ltd., which is open to all retailers of electrical accessories and electrical contractors. Competitors are asked to forecast what will be the final order of sales popularity, from the point of view of quantity during January, 1949, of twelve lines from the range of Clang Products. Cash prizes totalling 300 guineas are offered. The closing date for the competition is 1st February.

Wood Pole Preservation

Since printing its latest folder summarizing the economics of preserving by treatment wood poles for overhead power lines and listing the numbers of poles treated in different countries of Europe, Cobra (Wood Treatment), Ltd., announces that it has received orders for the protective treatment of 10,000 poles for the Merseyside and North Wales Electricity Board, 2,500 for the Isle of Man Board, 3,000 for the South-West Scotland Board, and 10,000 for the Northern Ireland Board.

Engine Sent by Air to Madrid

George Cohen, Sons & Co., Ltd., were recently called upon to supply at short notice a power unit urgently needed in Madrid to safeguard a British ice-show against breakdown. Prolonged drought in Spain had seriously affected the hydro-electric supply. The ice-show, which was being presented by Tom Arnold, was faced both with cuts in the electricity supplies

for the refrigerating plant and with inability to obtain diesel fuel oil for a stand-by generating set. It was decided to replace the diesel engine by a radiator-cooled petrol engine. A request from Tom Arnold's London office for a suitable set was received by the company and a Meadows 30 b.h.p. petrol engine at its Leeds depot was run up and tested on the day following confirmation of the order. By the afternoon the engine was packed and loaded on to a wagon, arriving in London the next day for despatch by air from Northolt to Madrid. Although fog stopped all air transport for seven days, a special charter aircraft took off for Spain as soon as weather conditions permitted.

Imperial College Lectures

The Imperial College of Science and Technology announces two post-graduate courses of lectures. The first course, of six lectures, begins on 18th January, the subject being "The Electrical Transmission of Speech in Reduced Bandwidth"; the speakers are Mr. R. J. Halsey (P.O. Research Station) and Dr. D. Gabor (Imperial College). "Scientific and Engineering Problems of Nuclear Power" is the subject of the other course (seven lectures) beginning on 20th January; the lecturers are Dr. O. Buneman and Mr. J. Diamond (Atomic Energy Research Establishment, Harwell). Syllabuses of the courses may be obtained from the Deputy Registrar, City and Guilds College, Exhibition Road, London, S.W.7. The fee for each course is 1½ guineas.

Electricity in the Hardware Trades

A report on the partial Census of Production in so far as it affected the hardware, hollow-ware, metallic furniture and sheet metal trades appears in the *Board of Trade Journal* for 1st January. It seems that in 1937 this group used electricity (generated and purchased) to the extent of 123.3 million kWh. In 1946 the total had risen to 175.3 million kWh, of which only 1.2 million was generated by the industries themselves.

Transport Conference

The 1949 Conference of the Public Transport Association will be held from 3rd to 5th May at Harrogate. The Conference headquarters will be at the Grand Hotel.

"Britain Goes Ahead"

One of the features at the "Britain Goes Ahead" Exhibition now at the Charing Cross Underground Station is a picture story supplied by Philips Electrical, Ltd., which shows how Mr. J. Collins, a machine tool setter at Philips Mitcham Works, Ltd., helped production by introducing shock absorbers on a double-ended hydraulic power press used for punching out cycle dynamo headlamp cases. For this and one other idea Mr. Collins received an award of £20 from the management.

Bromborough Strike

Six hundred men engaged on the construction of the new power station at Bromborough, Cheshire, went on strike last week as a protest against delays in an agreement being reached over the question of travelling expenses. The strike is unofficial. The dispute has been caused by the civil engineering section's claim that they have to meet expenses out of their own pockets while workers on the building section have their expenses paid.

A number of unions are involved, and negotiations have been taking place for some months. When the engineering section stopped work the building section came out in sympathy.

Brush Employee Training

The Brush Electrical Engineering Co.'s apprenticeship scheme is not concerned solely with the training of engineering craftsmen and technicians. It covers all young employees who join the company, whatever their sex or their intended trade or profession. They not only receive training in the Works Training School, but are also released for higher education classes at the Loughborough College. Many take National Certificate and other specialized courses at the College. Recently seventeen out of eighteen girls in the shorthand class have gained Pitman certificates.

Electricity in Flats

Electricity supply intake arrangements for flats and other multi-occupier buildings are the subject of Code of Practice CP.322.102 (1948) which is now available in its final form for 2s post free from the British Standards Institution, 24, Victoria Street, London, S.W.1. It deals principally with the installation of rising and lateral distributing mains, with particular attention to design and equipment of switch and meter rooms, distribution boards, types and sizes of ducts and chases.

Trade Announcements

The Sheffield offices of **Wild-Barfield Electric Furnaces, Ltd.**, and its associate, **G.W.B. Electric Furnaces, Ltd.**, are now at 4, Paradise Square, Sheffield, 1. The telephone number remains unchanged.

Mr. D. A. Haskell has been appointed sales representative for **J. H. Tucker & Co., Ltd.**, from 3rd January, covering the counties of Kent, Surrey, Sussex, Dorset, Hants,

Berks and Isle of Wight. His address is 54, Boscombe Grove Road, Bournemouth.

Miles Refrigeration, Ltd., 13, Bittacy Hill, Mill Hill, London, N.W.7, has set up a department to rebuild hermetically sealed refrigerator units to the original manufacturers' standard. Westinghouse, Crosley, B.T.H. and American G.E. refrigerators are included among the machines that the company is able to repair.

Mr. F. S. Bowles, who has been with the Wolverhampton supply undertaking (latterly M.E.B., Wolverhampton) for twenty-five years, has joined the staff of **F. Westerman (Wholesale), Ltd.,** as electrical sales manager and buyer.

Watten Emulsifying Machines, Ltd., announces that all sales and after-sales services are now undertaken direct from the company's address at 55, Wandle Rd., London, S.W.17 (Telephone: Balham 7076).

Mr. H. Martin, 62, Braemar Rd., Alton, Birmingham, has been appointed representative in Derbyshire, Leicestershire, Lincolnshire, Northants, Nottinghamshire, Staffordshire, Warwickshire, Yorkshire (East and West Riding) to **Clang, Ltd.** His telephone number is Acocks Green 1324.

British Mechanical Productions, Ltd., announces that the manufacture of its "Clix" electrical accessories and radio components is to be concentrated at the Bristol factory, where extra accommodation has been provided. The Wandsworth factory is being closed, but all employees at Wandsworth are being offered alternative employment at Bristol should they desire it. "Clix" components are marketed by an associated company, the General Accessories Co., Ltd., and both companies will retain offices in London.

Change of Name

The Philson Manufacturing Co., Ltd., has changed its name to Murray Swanson & Co., Ltd.

Midlands Division Appointments

There were two errors in an advertisement by the Midlands Division of the British Electricity Authority in our last issue (p. 59). Under "(f)" the vacancies were for five shift control (not charge) engineers, and five shift control room assistants ("g") are required.

Testing Electrical Apparatus

In consequence of the increase in the operational costs of maintaining the service for the testing and approval of safety lamps and electric lamp bulbs, and the testing and certification of intrinsically safe electrical apparatus, the Testing Branch, Health, Safety and Training Division of the Ministry of Fuel and Power has announced that the scale of fees will be subject to a 50 per cent increase as from 1st February.

Caroline Haslett Trust Lecture

Miss Dorothy Taylor will give the third Caroline Haslett Trust Lecture on 14th January at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, the title of her talk will be "Canada's Electricity, Policy, Peaks, Personnel."

Australian News

The Western Australian Government has now signed the agreement for the purchase of the Perth electricity and gas undertakings from the Perth City Council for £3,000,000. This amount will be paid in annual instalments of £60,000 over 50 years.

Dealers in all parts of the Commonwealth report that stocks of electrical merchandise continue to improve, with new patterns of cookers making their appearance. Australian production of electric ranges in February, 1948, totalled 1,811; in March there was a slight improvement to 2,290, but in April production had dropped again to 1,980. These figures represent a marked improvement over the 1946-47 production, when the average monthly output was 890.

Arising out of a fire on 8th February, 1943, at a flax mill operated by the Commonwealth Government at Riddell, Victoria, a claim for £31,841 damages was made recently against the Victorian Electricity Commission and the State of Victoria. The writ alleges that connections from the mains had not been properly phased.

Saving Power

To encourage employees to save power wherever possible, Oldham & Sons, Ltd., have fixed in appropriate positions throughout their factory a "Fuel Efficiency" wall sheet headed "Spare the Power," which is a play on the company's slogan "Power to Spare."

Catalogues and Lists

Lindley Thompson Transformer & Service Co., Ltd., St. Mary's Road, Slough.—A leaflet dealing with hermetically sealed transformers with Thompson relief chambers.

Falk, Stadelmann & Co., Ltd., 91, Farringdon Road, London, E.C.1.—Priced leaflet illustrating commercial fittings for single 5ft fluorescent lamps.

Dawe Instruments, Ltd., 130, Uxbridge Road, Hanwell, London, W.7.—Illustrated folder, being an index to electrical instruments manufactured by the company.

Material Supplies

PRODUCTION, CONSUMPTION AND PRICES IN 1948

THE following survey of the supply position in 1948 of the chief materials used in the electrical manufacturing industry has been compiled for us by the Metal Information Bureau, Ltd.

COPPER.—The British Government's official maximum selling price for electrolytic copper, £132 a ton, which was made effective on 14th July, 1947, remained in force until 1st October, 1948, on which date it was raised £8 to £140 a ton. On the world market the export quotation opened the year at 21⅜ cents per lb f.a.s. New York, but with the United States still a heavy consumer very little early shipment metal was available: when obtainable any copper which was to be had for payment in sterling commanded a ready premium.

United Kingdom consumption of copper during 1947 totalled 540,886 tons (350,119 tons virgin and 190,767 tons secondary), which compared with 493,716 tons (325,409 and 168,307 tons) during the previous twelve months. In March the Ministry of Supply announced the necessity for imposing some restriction on the U.K. consumption of copper, but as this was ultimately fixed at 30,000 tons a month (virgin), consumers in this country were really put to very little inconvenience, whilst the fact that arrangements had been made for importing metal from such countries as Chile and Canada made the 1948 outlook for the British consumer reasonably bright. Following an appeal by the Chancellor of the Exchequer for a curtailment of profits and prices, some copper and brass product prices were reduced as from 1st April.

In the meantime, the uncertain political situation in the world had resulted in a "terrific" demand being reported from the United States, mainly brought about by a desire on the part of consumers to ensure an adequate reserve, but assisted by the knowledge that the Government was eager to accumulate as large a strategic stockpile of copper as possible. The world export quotation firmed up sharply, and with the availability of E.R.P. funds buying interest by European nations once again became apparent—the overall shortage of metal for shipment remained very much in evidence, however. Subsequently the American domestic quotation for copper was raised from 21½ to 23½ cents per lb.

The London Metal Exchange remained closed throughout the year despite continued efforts on the part of the Committee to get the Government to agree to a resumption of operations.

TIN.—The year opened with the price of tin to United Kingdom consumers standing at £510 a ton (to which level it was raised on 17th December, 1947); on 6th January, 1948, the price was further advanced to £519 a ton. The question of remuneration received from the Ministry of Supply, the sole buyer, was causing a good deal of dissatisfaction amongst producers in Malaya, who claimed substantial increases in costs of production, and it was not until the Ministry's buying price for Malayan metal was raised to £554 a ton on 1st June that they were in any measure mollified. With effect from the same date the U.K. quotation was advanced to £569 a ton.

In the meantime the world supply and demand position had continued gradually to improve, and although there remained a shortage of tin throughout the world most of the major consumers found it possible to jog along fairly satisfactorily on their allocations. Consumption of tin was, however, affected to a degree by the non-availability of other materials, notably steel. U.K. consumers appeared to be reasonably supplied, but with consumption and home production doing no more than balance it remained impossible to step up exports of English refined tin. Consumption during 1947 totalled 34,500 tons, as against 33,200 tons in 1946.

Available supplies of tin throughout the world continued to be allocated through the medium of the Combined Tin Committee sitting in Washington, and it is noteworthy that allocations made by this organization were, on occasion, not immediately taken up. In

July a surprise announcement by the British Government stated that the special export tax on Malayan ore to other than Empire countries was to be dropped, and it thus became possible for the Longhorn smelter in the United States to utilize high-grade Malayan material to "sweeten" the low-grade Bolivian ore it normally used. The main item of interest towards the year's close was the meeting of the International Tin Study Group at The Hague in October, where some discussion took place on the desirability of introducing some form of price stabilization or output control as and when production began to overtake consumption. The Governments concerned are studying proposals (not made public) for a control scheme proposed by the Study Group.

LEAD.—Broadly speaking, the fundamental situation in lead throughout the world during the past year showed little real change from that which prevailed during the preceding twelve months. Demand by all major consuming countries continued to run well in excess of producing nations' ability to supply, whilst the sporadic outbreak of strikes did nothing more than aggravate an already difficult situation. The United States, which at one time was believed to have achieved a measure of balance between supply and demand, became a substantial importer of lead, whilst the ever-present needs of the stockpile further unsettled the outlook.

In efforts to maintain continuity of supply American consumers began to pay higher and higher prices for imported lead until domestic producers were forced to raise their selling quotation from the 15 cents per lb which ruled at the beginning of the year to 21½ cents at the close. The U.S. Government waived its import duty on lead, ore and scrap for one year to 30th June, 1949, in an attempt to attract supplies, but even so the demand for secondary metal and the prices paid continued to grow. During this time any lead which became available for payment in sterling was very eagerly snapped up; offerings, however, were very small.

United Kingdom consumers appeared to be rather better placed in the matter of supplies than a good many other nations, but since Britain obtains her lead supplies from abroad the Ministry of Supply was unable to stave off an increase in price—the year opened with the official quotation standing at £90 a ton and closed with the British consumer being charged £112 a ton. On 1st January a further increase raised the price to £123.

ZINC.—The situation in zinc during the past year has been characterized by a strong demand in the face of inadequate supplies and as consumers have made stronger efforts to obtain deliveries prices have hardened accordingly. Owing to continued strike activities in various producing centres the supply of zinc concentrate was hampered on various occasions throughout the year, whilst the U.S. Government's known desire to accumulate substantial quantities for the strategic stockpile stressed the already firm tone of the international market.

As a result of American efforts to obtain supplies of foreign ore the Belgian smelters at one time found difficulty in covering their needs and were even forced at one stage to close down some furnaces. As with lead, where U.S. consumers paid premiums for imported metal over the domestic quotation, so in zinc did the price paid for secondary equal, and in some cases exceed, that of virgin metal.

In Britain, demand throughout the year continued to run ahead of supply, but on the whole, with the exception of high-grade metal, consumers managed to cater for their more important requirements. The country's stock position, however, left a good deal to be desired although some slight improvement was noticeable towards the close of the year as consumption declined.

The shortage of dollars in Britain had an adverse effect on the supply position throughout the year since the bulk of U.K. requirements come from dollar sources, and this fact was in large measure responsible for the Government's decision to restrict zinc consumption, in some instances by as much as 20 per cent. The Ministry of Supply's selling quotation at the commencement of the year stood at £70 a ton; on 30th January it was raised to £75; on 1st October to £92; and on 1st December to £106 per ton.

ALUMINIUM.—The past year continued the process of confounding the opinion that the post-war demand for aluminium throughout the world would be amply catered for by existing productive

capacity and this has been particularly true of the United States. The light metal has continued to make very substantial inroads into fields of application normally regarded as the domain of the better-established metals such as copper, zinc, lead and even steel, and there can be little doubt that its utilization in many instances will remain permanent.

As many of these materials remain in critical supply it can be assumed that aluminium, in the short-term outlook at any rate, will strengthen the toe-hold gained by virtue of its appreciable price advantage and comparative sufficiency of supply. This is not to suggest, however, that users of aluminium find no difficulty in covering their total requirements since expanding industrial, aircraft and defence needs have placed a great strain on producing plants, whilst output has been hampered by shortage of the all-important power necessary to the production of aluminium. Added to this is the obligation to supply many needy countries with the light metal under the Marshall Plan.

So far as Britain is concerned demand is well maintained, but although ingot remains in good supply, in some directions difficulty continues to be experienced in the acquisition of fabricated items. Only one alteration was recorded in the U.K. official quotation during the year when standard ingot was raised from £80 to £87 a ton on 1st October.

IRON and STEEL.—Fundamentally, the situation in the British iron and steel industry during the past year showed little material change from that which characterized it during 1947; demand, both on home and export account, for practically all forms of output remained very strong and whilst "priority" users received 100 per cent of their requirements, it is probably true to say that most consumers had to make do with only a proportion of their total needs. Activity in practically all branches of the industry remained intense and with almost unbroken regularity as each month's production figures were disclosed, new records were shown to have been achieved.

The Government's output target for the year was originally fixed at 14,000,000 tons of steel ingots, but as it became apparent that little real difficulty would be met in attaining this figure the target was advanced to 14,500,000 tons. Some indication of the efforts being made by the producing plants can be obtained from the fact that production during November was equivalent to an annual rate of 15,756,000 tons.

To a considerable extent, however, the efforts of the industry depended on the adequate supply of fuel, and it can happily be recorded that as the year progressed the supply of coal to the ovens improved, with what result has already been mentioned. A big stumbling block throughout the year remained the extreme shortage of scrap, and despite the institution of a "drive" and pronounced efforts to obtain quantities from abroad, the overall tonnage available remained insufficient for the needs of the melting shops. It is hoped, however, that increased shipments will be made from Germany. During the year the proposed nationalization of the iron and steel industry was proceeded with by the Government.

Various price increases were brought into effect during the year.

RUBBER.—The raw rubber market saw some fairly wide fluctuations in prices during 1948. Ribbed smoked sheet, after opening just over 13d per lb, fell away to 11½d in March (for forward delivery). A steady rise followed on political tension in Europe coupled with good Russian and American buying and outbreaks of violence in Malaya. Quotations climbed to the highest level for 20 years at 15½d in July, but subsequently the tone was easier. The trouble in Malaya did not affect production so much as was feared at first and currency problems kept European demand to a modest level. The U.S.A. continues to pay a good deal of attention to synthetic rubber for strategic reasons, but was reported to have made a counter offer to one by Russia for Ceylon's 1949 output.

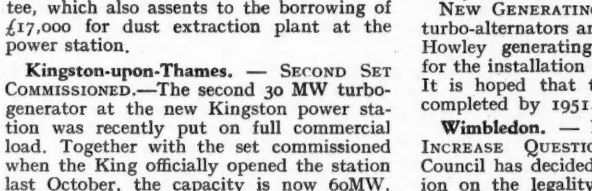
The year closed with prices around 11½d and the market dull. World production and consumption of natural rubber seem in reasonable balance, but stocks are quite substantial, and unless there is a marked recovery in demand in 1949 it seems doubtful whether the market will display any fireworks. There is still a good deal of internal unrest in Malaya and Indonesia, but on the whole production is being quite well maintained.

Electricity Supply

Large Belfast Loan : Second Kingston Set Commissioned

Belfast.—HARBOUR POWER STATION EXTENSIONS.—It is proposed to apply to the Ministry of Commerce for sanction to raise a loan of £1,817,860 to cover the cost of plant extensions at the Harbour power station. Recommendations to this effect by the city electrical engineer and the consulting engineers were adopted at a special meeting of the Electricity Committee. No objection is made by the Finance Committee, which also assents to the borrowing of £17,000 for dust extraction plant at the power station.

Kingston-upon-Thames. — SECOND SET COMMISSIONED.—The second 30 MW turbo-generator at the new Kingston power station was recently put on full commercial load. Together with the set commissioned when the King officially opened the station last October, the capacity is now 60MW, half of that for which the station is ultimately designed. Buildings for the second half of the station are nearing completion and it is expected that the whole station will be in operation next year. The total estimated cost is £5,850,000. On Wednesdays and Fridays until 21st January the public may inspect the station; tickets of admission are obtainable from the secretary to the B.E.A. South Eastern Division, Kingston.



Work in progress on the Girotte barrage scheme

Pudsey.—MERCURY LIGHTING. — Following an experimental installation near the Town Hall, Farsley Town Street and Old Road are to be relighted with mercury-vapour lamps.

Reading. — STREET LIGHTING CONVERSION.—The Corporation has approved schemes for the conversion of 637 street lamps from gas to electricity, The estimated cost is £16,125.

Warrington.—CHANGE-OVER COMPLETED. —The change-over from d.c. to a.c., started about 25 years ago, was completed last week by the final switch-over at the works of Rylands Bros., Ltd.

NEW GENERATING SET.—Two 6,000 kW turbo-alternators are to be moved from the Howley generating station to make room for the installation of a new 30,000 kW set. It is hoped that this programme will be completed by 1951.

Wimbledon. — LEGALITY OF PRICE INCREASE QUESTIONED. — The Borough Council has decided to take counsel's opinion on the legality of the winter increase in electricity charges. A councillor who opposed the proposal asserted that it would be a waste of money because even if the Council won a case in the High Court the Government would pass an amending Bill to legalize the increase.

Overseas

France. — GIROTTE BARRAGE.—Work now being carried out at the Girotte Lake is designed to increase and regulate production of seven hydro - electric plants downstream from the lake. Situated at an altitude of 1,700 m, the lake is fed from a reservoir under the Tre la Tête glacier, about 15 km distant. The existing small barrage is being replaced by a larger one, the total height of the falls being 1,402 m. Plants dependent on the Girotte Lake will produce altogether some 100 million to 200 million kWh annually, and the barrage itself will include a plant producing about 18 million kWh.

Switzerland. — DROUGHT CAUSES POWER SHORTAGE.—Because of the long dry spell electric heating in private homes has been banned and domestic electric boilers may be used only on certain days Factories must reduce consumption by one-fifth.

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

The Radio and Television Trust, Ltd.—In the course of his statement issued with the report and accounts, Mr. L. D. Bennett (chairman and managing director) says that the directors have decided to give up radio manufacture and selling and concentrate all activity on other branches of the electrical industry in which the group is engaged, and which show greater stability. The Perivale factory has been sold and since the close of the year under review plans have been made to stop all manufacture and sale of radio receivers. Trading profits for the year are satisfactory although the full productive power of the group was not fully utilized. The new factory at Cardiff for Hopkinson Electric Co., Ltd., was completed during the year, and production is now going on at an increasing rate. Britannic Electric Cable & Construction Co., Ltd., British Mechanical Productions, Ltd., and the General Accessories Co., Ltd., traded successfully during the year. Now that the radio side of the group's business is being terminated it is proposed in due course to change the name of the company to Cable & Electric Industries, Ltd., and a nominal company has been formed with that name.

The Plessey Co., Ltd.—The annual meeting was held on 30th December. In his statement, issued with the report and accounts, Mr. A. G. Clark (chairman and managing director) says that the past year has not been an easy one. They have, however, surmounted the many problems and production is now running at a more satisfactory level than was the case some months ago. The raw material position has become easier since December, 1947. The benefits from the change-over from war to peacetime economy of the company and its subsidiaries were only beginning to be felt during the closing period of the financial year under review.

S. Smith & Sons (England), Ltd.—In the course of his speech at the annual meeting held on 31st December, Sir Allan Gordon-Smith (chairman) said that all four divisions of the company had shown considerable expansion of trade. Smiths Motor Accessories had maintained its position as the leading maker of instruments for the automobile industry, the aircraft instruments division had had a successful year, and the clock and watch division had developed rapidly during the past few years. The factories specializing in the production of clocks and watches were producing at the rate of 3¾ million per annum, and the programme for the current year was for approximately 4½ million. During 1948 approximately 80 per cent of all clocks exported from the United Kingdom were of Smiths make. Smiths Industrial Instruments, Ltd., the youngest division, had made equal progress with the older branches. Their associated company, Kelvin & Hughes, Ltd., had continued to make satisfactory progress, and the Kelvin-Hughes marine radar set had had a wide acceptance in the shipping world, and the company had a large number of orders on hand for it.

Oliver Pell Control, Ltd., announces that no preference dividend will be paid as at 31st December last.

Radio Rentals, Ltd., proposes to pay a final dividend of 17½ per cent, maintaining the distribution for the year at 25 per cent. Subject to completion of audit, the net profit for the year ended 31st August last is £89,244, as compared with £51,355 for the preceding year.

London and Home Counties J.E.A.

A meeting of holders of securities of the former London and Home Counties Joint Electricity Authority will be held on 27th January at the London offices of the South-Eastern Electricity Board, 5-6, Lancaster Place, Strand, W.C.2, to receive from the Stockholders' Representative a statement showing how he has carried out his duties under the Electricity Act, 1947, and the Electricity (Stockholders' Representatives) Regulations, 1947, and his accounts, together with the report of the auditors thereon.

New Companies

City Electrical Installations (Cobridge), Ltd.—Registered 14th December. Capital, £1,000. To acquire the business carried on by J. Hilton, J. Kilfoil and J. Reynolds at Cobridge, as "J. Hilton & Co." Directors: J. Kilfoil, J. Hilton and J. Reynolds, Secretary: J. Kilfoil. Regd. office: 166, Elder Road, Cobridge, Stoke-on-Trent.

R. C. Thomas & Co., Ltd.—Registered 3rd December. Capital £2,000. To acquire the business of electrical engineers carried on at 25, Commercial Road, Swindon, by R. C. Thomas. Directors: R. C. Thomas and H. C. L. Baggs. Regd. office: 25, Commercial Road, Swindon.

Burgess & Gartshore, Ltd.—Registered 2nd December. Capital £1,000. To acquire the business of electrical contractors carried on by G. Burgess and E. Gartshore as Burgess & Gartshore at 57, Darlington Street, Wolverhampton. Directors: G.

Burgess and E. Gartshore. Regd. office: 57, Darlington Street, Wolverhampton.

Johnson (Electrical Services), Ltd.—Registered 3rd December. Capital £1,000. To acquire the business of an electrical engineer and radio manufacturer carried on by P. Johnson at 14, Langport Road, Weston-super-Mare. Directors: P. Johnson (permanent managing director) and Mrs. Miriam Johnson. Regd. office: 14a, The Centre, Weston-super-Mare.

C.E.T. Electrical & Mechanical Components, Ltd.—Registered 21st December. Capital £2,000. Manufacturers of all appliances and components relating to electrical and mechanical work, etc. Directors: J. H. M. Dickie, W. I. D. van Troostwyk, and F. Finkielkraut. Regd. office: 110, Fenchurch Street, E.C.3.

U. V. Beams, Ltd.—Registered 21st December. Capital £3,000. Publicity specialists, with special reference to the manufacture, sale or hire of lighting and signs, including ultra-violet and infra-red ray signs and fluorescent lighting and signs, etc. Subscribers: J. W. Young and S. A. Lloyd. Solicitors: Alderson Smith & Hughes, 109, Gloucester Place, W.1.

Nucleons, Ltd.—Registered 22nd December. Capital £2,500. Designers and manufacturers of and dealers in radio transmitters and receivers, high frequency equipment, etc. Directors: H. R. Paddison and J. E. Wing. Regd. office: 106, Bolsover Street, W.1.

Fawns (Aldershot), Ltd.—Registered 3rd December. Capital £1,000. Manufacturers and repairers of and dealers in and hirers of electric accumulators and batteries, electrical and mechanical engineers, etc. Directors: B. Funnell and L. C. Funnell. Regd. office: 54, Coronation Road, Aldershot.

Increases of Capital

Cambridge Electrical Components, Ltd.—Increased by £3,000, in £1 shares, beyond the registered capital of £2,000.

Mead Electric Co., Ltd.—Increased by £3,000 in £1 ordinary shares, beyond the registered capital of £2,000.

Companies to be Struck Off the Register

The names of the following companies will be struck off the Register at the expiration of three months from 31st December, 1948, unless cause is shown to the contrary:—

British Electrical Sales Agency, Ltd.; Loudspeaker Telephones, Ltd.

Liquidations

Hotric, Ltd., manufacturers of electric water heaters, West Road, London, N.17.—The statutory meeting of creditors of this company was held recently at the Waldorf Hotel, Aldwych, W.C.2, when a statement of affairs was submitted which disclosed liabilities amounting to £7,920, and assets of £1,659, leaving a deficiency of £6,261. A resolution was passed for the appointment of Mr. D. Morgan, accountant, of 19, St. Martin's Street, London, W.C., as liquidator, together with a committee of inspection.

Marconi-E.M.I. Television Co., Ltd.—Members' voluntary winding up. Meeting of members on 11th February, at 3, Frederick's Place, Old Jewry, London, E.C.2, to receive an account of the winding-up by the liquidator, Mr. T. Howorth.

Thermo Electrical Engineering Co., Ltd.—Members' voluntary winding-up. General meeting of members on 29th January at 14, Carmichael Place, Langside, Glasgow, S.2, to receive an account of the winding-up by the liquidator, Mr. R. J. Donnelly.

Bankruptcies

A. H. Smith, 3, Harlesden Gardens, Harlesden, London, N.W.10, sales manager, formerly company director, and lately carrying on business at 62-64, Lower Sloane Street, London, S.W.1, electrical engineer.—Discharge suspended for three years until 23rd November, 1951.

A. V. Richardson, residing at 5, Grantham Road, Bradford, radio and electrical engineer, and carrying on business at 126, Manningham Lane, and lately carrying on business at John Street, Open Market, and 195, Manchester Road, all in Bradford, under the style of Market Radio & Electrical Supplies, and formerly carrying on business in partnership with another at 81, Manchester Road, Bradford, as an auctioneer.—Trustee, Mr. G. F. Morris, Hallfield Chambers, 71, Manningham Lane, Bradford, Official Receiver, released 20th December, 1948.

L. Dean, Hazebrook Camp, Arborfield, Reading, lately residing at 2, Saxon Mansions, Grand Parade, St. Leonards-on-Sea, electrical engineer.—Receiving order made 20th December, 1948, on a creditor's petition.

W. E. Bernadis, 6, Atlas Place, Cardiff, electrician, formerly trading as Winbern Electrical Contractors, at 26, Charles Street, Cardiff.—First meeting 7th January, at 34, Park Place, Cardiff. Public examination 9th February, at the Law Courts, Cardiff.

STOCKS and SHARES

THE New Year has opened in the Stock Exchange with firm prices and, amongst investment securities, a continuance of the good tendency noticeable during December. The "tax-selling," which held prices back to some extent a month ago, is now relaxed. Reinvestment of January interest and dividends serves to accentuate the scarcity of floating supplies of stocks available for would-be purchasers.

Problems facing industry at the present time are largely concerned with the difficulty of providing real capital to meet increasing costs, and the heavy weight of taxation, both of which make themselves felt in most branches. So far as the companies engaged in electrical manufacture and equipment work are concerned, this particular problem is less pressing than it is in many other directions, because the former companies in most cases occupy strong financial positions and are able to finance from their own resources the needs which arise. In view of the rapid expansion of electrical work, however, the necessity for raising substantial fresh capital is likely to be encountered at a comparatively early date; in the meantime, this consideration has no effect upon the firmness of prices. The gilt-edged market is also well sustained; a mild feature is fresh improvement in Cable & Wireless ordinary stock.

Electrical Equipment Prospects

The case for investing in electrical engineering shares is ably set out in Crompton Parkinson's annual report, and Mr. Albert Parkinson's statement, issued with it and summarized in last week's *Electrical Review*. The year's expansion was due more to increased quantity and efficiency than to inflated prices. Improvements in the former respect are continuously in progress, and are paid for, to a large extent, from the profits of the business.

The consolidated accounts of Crompton Parkinson showed that trading profits of the group, at the record level of £1,688,000, expanded a good deal beyond the extent of the increase shown earlier in the parent company's preliminary figures, published here on 17th December. Group profits exceed half a million, after all charges, including tax and the preference dividends. Ordinary dividends and bonus require £327,000, less income tax, so that substantial sums are retained, as usual, in the business. Balance sheet figures have assumed even more impressive proportions. Reserves and surplus represent practically double the £1,537,000 ordinary capital; net liquid assets are over the £4 million mark; stocks have increased by more than half After hardening to 28s 6d, the 5s "A" shares are in the select group of industrials yielding under 4 per cent.

Highs and Lows

By way of complement to the tables produced here last week, which compared electrical share prices at the beginning and end of 1948, the figures below compare current prices with the highest and lowest recorded in the same disturbed period. Considering the conditions, the extent of the swing in electrical equipment shares does credit to the companies' investment reputation: the fact that to-day's prices stand midway between the best and the worst of 1948 is a fair commentary on investment sentiment as it faces 1949. It is worth noting that in many cases both extremes were recorded in the first two months of the year. Prices were at their best during the railway takeover at the turn of last year, but February's chilling White Papers produced some of the year's lowest readings on the market charts.

Equipment and Manufacturing

Comparisons referred to above are applied as follows to some of the leading electrical engineering shares:—

Ordinary Share	1948 High	1948 Low	Now
	s. d.	s. d.	s. d.
A.E.I.	87 6	69 0	78 3
Auto. Telephone ...	67 0	59 0	63 3
B.I.C.	40 9	31 9	36 0
Crompton Parkinson...	30 6	23 9	28 6
English Electric ...	58 9	43 6	48 9
G.E.C.	95 6	80 0	90 0
Henley's	26 6	22 6	26 0
Reyrolle	69 6	58 9	61 3
Siemens	36 3	31 3	35 6

Radio and Others

This selection includes a record of the erratic performances of radio shares, and the very substantial appreciation of Cable & Wireless and Tillings ordinary on nationalization developments. International "Tel. and Tel." shares reflect Wall Street's experience:—

Ordinary Stock or Share	1948 High	1948 Low	Now
	s. d.	s. d.	s. d.
Brush	8 0	5 10	7 3
Cossor	19 0	7 3	11 0
Decca	41 9	17 6	23 6
E.M.I.	21 9	14 9	21 0
Ever Ready	41 3	33 3	37 0
Vactric...	18 3	4 9	15 0
Tillings...	124 6	75 3	124 6
Cable & Wireless ...	218	170	218
Anglo Amer. Tel. ...	72	60	71½
Int. Tel. & Tel. ...	25	15	15

Electrical Investments

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 3rd Jan. 1949	Month's Rise or Fall	Yield £ s. d. p.c.
Overseas Electricity Companies					£ s. d.
Atlas Elec. ...	Nil	2	13/9	...	2 18 0
Calcutta Elec. ...	6†	6†	33/6	+6d.	3 11 7
Cawnpore Elec. ...	13	13	37/6	−½	6 18 8
East African Power	7	7	46/6	...	3 0 4
Jerusalem Elec. ...	5	6	16/3	−1/6	7 7 8
Madras Elec. ...	8	5	32/6	−5/-	3 1 6
Nigerian Elec. ...	12½	10	36/-	...	5 11 1
Palestine Elec. "A"	7†	Nil	27/6	...	—
Perak Hydro-elec.	Nil	Nil	13/6	+1/-	—
Whitehall Inv. Pref.	—	6	25/6	...	4 14 1
Equipment and Manufacturing					
Aberdare Cable ...	10	15	63/3	+1/6	4 10 4
Aron Elec. Ord. ...	15	15	50/-	...	6 0 0
Assoc. Elec. Ord. ...	15	15	78/3	...	3 17 0
Automatic Tel. & El.	12½	12½	63/3	...	3 19 1
Babcock & Wilcox	15	15	75/-	+3/3	4 0 0
Baldwin, H. J. (2/-)	25	25	8/9	...	5 14 3
British Aluminium	10	10	50/6	+1/6	3 19 2
B.I. Callender's ...	6¾	6¾	36/-	−6d.	3 14 0
British Thermostat (5/-)	23⅛	23⅛	27/6	9d.	4 5 6
British Vac. Cleaner (5/-)	20	20	13/9	+9d.	7 5 6
Brush Ord. (5/-) ...	—	—	7/3	−3d.	—
Burco (5/-) ...	35	35	23/9	−9d.	7 7 4
Chloride El. Storage	20	20	100/-	...	4 0 0
Cole, E. K. (5/-) ...	20	22½	15/6	...	7 5 2
Cossor, A. C. (5/-)...	25	Nil	11/-	...	—
Crabtree (10/-) ...	17½	17½	43/-	...	4 1 5
Crompton Parkinson Ord. (5/-) ...	22½	22½	28/6	+1/-	3 17 0
De La Rue (5/-) ...	50	50	37/-	+9d.	6 15 2
Decca (1/-) ...	112½	112½	23/6	+1/-	4 18 0
E.M.I. (10/-) ...	6	8	21/-	+2/6	3 16 2
Electrical Components (5/-) ...	20	20	12/6	...	8 0 0
Elec. Construction	12½	12½	53/9	...	4 13 0
Enfield Cable Ord.	7½	7½	36/-	...	4 3 4
English Electric ...	10	10	48/9	−9d.	4 2 0
Ericsson Tel. (5/-)...	20†	20†	45/-	...	2 4 6
Ever Ready (5/-)...	40	40	37/-	...	5 8 1
Falk Stadelmann...	10	15	43/9	...	6 17 0
G.E.C. Ord. ...	17½	17½	90/-	...	3 17 9
General Cables (5/-)	25	50	37/6	...	6 13 4
Greenwood & Batley	15	15	53/3	+9d.	5 12 9
Hackbridge Cable (5/-)	—	20(est.)	15/9	...	—
Hackbridge Hewittic (5/-)	6	12	11/9	+3d.	5 2 2
Hall's Tel. Acc. (10/-)	10	10	13/3	...	7 11 0
Heatrae (2/-) ...	12½	12½	5/-	...	5 0 0
Henley's (5/-) ...	20	20	26/-	+1/-	3 17 0
Hoover (5/-) ...	40	40	37/6	...	5 6 8
Intl. Combustion (5/-)	37½	37½	46/3	...	4 1 6
Johnson & Phillips	15	15	71/-	+6d.	4 6 6

Company	Dividend Previous	Dividend Last	Middle Price 3rd Jan. 1949	Month's Rise or Fall	Yield £ s. d. p.c.
Equipment and Manufacturing (Continued)					£ s. d.
Lancashire Dynamo	22½	22½	5⅛	...	4 5 9
Laurence, Scott (5/-)	12½	12½	15/-	...	4 3 4
London Elec. Wire	10	10	48/3	+9d.	4 3 0
J. Lucas	17½	17½	90/-	+5/.	3 17 9
Mather & Platt ...	11	11	53/9	...	4 1 9
Metal Industries (B)	10	10	48/-	−1/6	4 3 4
Mid. Elec. Mfg. ...	35	35	8½	...	4 5 0
Murex	20	20	97/6	...	4 2 0
Newman Ind. (2/-)	22½	22½	6/9	...	6 13 6
Oldham & Son (1/-)	60	60	11/-	...	5 9 0
Plessey (5/-) ...	30	20	17/6	...	5 14 3
Parsons C. A. ...	12½	12½	62/-	...	4 0 8
Pye Deferred (5/-)	25	25	28/3	...	4 8 6
Radio & Tel. (2/-)	40	25	6/-	−6d.	8 6 8
Revo (10/-) ...	27½	27½	60/9	...	4 10 6
Reyrolle	12½	12½	61/3	−1/6	4 1 7
Scophony (5/-) ...	—	—	2/9	+1/-	—
Scot. Cable (4/-) ...	30	30	24/6	+3d.	—
Siemens Ord. ...	7½	7½	35/6	−6d.	4 4 6
Switchgear & Cowans (5/-)	10	20	18/-	+6d.	5 11 1
T.C.C. (10/-) ...	15	15	32/6	...	4 12 4
T.C. & M.	10	10	49/6	+2/-	4 1 0
Telephone Mfg. (5/-)	9	9	10/3	...	4 7 10
Thorn Elec. (5/-) ...	25	25	20/-	...	6 5 0
Tube Investments...	25	25	6⅛	+2/6	3 14 10
Vactric (5/-) ...	Nil	Nil	15/-	+3/-	—
Veritys (5/-) ...	2½	5	5/-	...	5 0 0
Walsall Conduits (4/-)	70	70	57/6	...	4 17 3
Ward & Goldstone (5/-)	50	50	58/6	−6d.	4 5 7
Watford (2/-) ...	15	15	6/-	+3d.	5 0 0
Westinghouse Brake	14	14	68/9	...	4 1 5
West, Allen (5/-) ...	10	10	11/-	...	4 11 0
Transport and Communications					
Anglo-Am. Tel.:					
Pref.	6	5 5/6	122½	+5	—
Def.	1½	1½*	22½	...	—
Anglo-Portuguese...	8	8	31/3	+1/6	5 2 5
Brit. Elec. Traction:					
Def. Ord. ...	50	50	1975	+50	2 10 7
Calcutta Trams ...	10	Nil	29/-	+6d.	—
Cape Elec. Trams...	6	6	26/3	−1/6	4 11 5
Cable & Wireless:					
5½ Pref.	5½	5½	129½	+3	4 5 0
Ord.	4	4	218	+4½	—
Globe Tel. & Tel. Ord.	5†	5†	48/6	−1/6	2 1 4
Great Northern Tel. (£10)	15	12	21	...	5 14 3
Inter. Tel. & Tel....	Nil	Nil	15	...	—
Marconi-Marine ...	7½	7½	31/-	−6d.	4 16 9
Oriental Tel. Ord....	10	16	51/3	−2/9	6 5 0
Telephone Props. ...	6	6	17/6	...	6 17 2
Tele. Rentals (5/-)	10	10	11/-	...	4 11 0
T. Tilling	10	10	124/6	+2/6	—

* Dividend postponed.

† Dividends are paid free of Income Tax.

Australian Electrical Exports

THE following statement based on the official returns of Australia's overseas trade which have recently been issued in Canberra, shows the principal groups of electrical exports in 1946-47 with notes of changes compared with 1945-46. It will be seen that increases took place throughout and especially in machinery, radio goods and wire and cable. Malaya and New Zealand were the outstanding markets for Australian equipment while India and Palestine were noteworthy.

Class of Goods	1946/47 £A (000)	Inc. or dec. on 1945/46 £A (000)
Covered cable and wire, etc. ...	98	+ 55
To Hong Kong	16	− 6
,, Malaya	20	+ 15
,, New Zealand	8	+ 3
,, Nauru	8	+ 6
,, British Borneo	13	+ 13
Transformers and rectifiers, non-rotating	8	− 1
To New Guinea	3	+ 3
,, New Zealand	2	+ 2
Regulating, starting and controlling apparatus	47	+ 28
To New Guinea	1	+ 1
,, New Zealand	18	+ 9
,, Malaya	9	+ 9
,, India	6	+ 6
,, South Africa	4	+ 4
Miscellaneous electrical fittings and wiring devices	47	+ 27
To Malaya	15	+ 13
,, New Guinea	3	+ 3
,, Netherlands East Indies	1	− 2
,, India	9	+ 8
,, New Zealand	10	—
Dry batteries and cells	115	− 8
To Malaya	65	− 33
,, New Guinea	2	− 8
,, Fiji	3	—
,, Burma	20	+ 20
Storage batteries and parts ...	20	+ 16
To Malaya	9	+ 7
Filament lamps for lighting and heating	74	+ 32
To Hong Kong	14	+ 8
,, Malaya	42	+ 17
,, New Zealand	3	+ 2
,, China	4	+ 4
Other electric lamps	5	− 1
To Malaya	3	+ 2
,, New Zealand	1	—
Transmitting sets	29	—
To Netherlands East Indies	3	+ 3
,, New Zealand	19	− 5
Radio sets	77	+ 43
To Hong Kong	15	+ 15
,, India	3	− 1
,, Malaya	18	+ 16
,, New Guinea	5	+ 1
,, South Africa	9	+ 8
,, China	7	+ 7
Radio parts	82	+ 30
To New Zealand	32	+ 19
,, Netherlands East Indies	21	+ 5
,, Hong Kong	4	+ 4
Radio valves	26	+ 19
Telephone and telegraph instruments and appliances	21	+ 5
To New Zealand	5	− 8
,, India	4	+ 3
Miscellaneous electrical appliances	97	+ 40
To New Zealand	20	+ 8
,, India	14	+ 6
,, Malaya	26	+ 9
Alternators, generators and motors for motor vehicles and cycles ...	52	+ 39
To India	14	+ 12
,, Malaya	6	+ 3
,, Canada	7	+ 6
,, South Africa	10	+ 6
Other current generating machines	51	+ 22
To Malaya	15	+ 13
,, New Zealand	4	+ 2
,, India	4	+ 3
,, Japan	4	+ 4
,, Palestine	6	+ 6
Electric motors, n.e.s.	17	+ 8
To Malaya	2	+ 1
,, New Zealand	6	+ 4
,, Nauru	1	− 2

Canadian Production

DETAILS regarding the manufacture of electrical goods and apparatus in Canada in 1947 have now been issued in Ottawa. They show that the value of production was $366.5 million, an increase of over 50 per cent on the 1946 total. In addition, $59 million worth of electrical goods were made by firms classified in other groups of industries. Such goods included porcelain insulators and electric washing machines. The number of firms engaged in the industry was 296, compared with 247 in 1945. The principal items are set out in the table on page 38, with comparative values for 1946.

Canadian electrical engineering concerns have been turning out more of the higher capacities of a.c. generators. In 1947 those of more than 1,000 kVA numbered thirteen with a total rating of 153,863 kVA valued at $1,742,800 compared with six of a total rating of 101,250 kVA valued at $959,300 in 1946. A noteworthy advance in the transformer group was in power transformers over 7,500 kVA or over 132 kV which totalled 22 of a total rating of 313,666 kVA valued at $679,890 in 1946 and increased to 44 of a total rating of 731,160 kVA valued at $1,722,968 in 1947.

An increase of approximately 100 per cent in the value of wires and cables made in Canada between 1946 and 1947 merits some

closer analysis. First it should be noted that 20 per cent consisted of uninsulated conductors, including trolley wire. Weatherproof wires of all types totalled nearly $7,000,000 in value and paper insulated telephone cable $7,280,000, more than double

Class of Product	1946 $ (000)	1947 $ (000)
Storage batteries	9,573	13,555
Vacuum cleaners and parts	3,120	5,823
Generators, a.c.	1,221	2,141
Generators, d.c.	357	484
Convertor equipment	305	1,055
Lamps, standard size	6,554	7,172
Lamps, miniature	38,581	1,768
Lighting fixtures	11,786	13,886
Washing machines, electric	7,084	16,544
Furnaces	453	544
Watt-hour meters	3,231	5,102
Wires and cables	39,434	77,695
Motors and parts	18,593	25,887
Industrial control equipt.	4,203	6,160
Radio receiving sets	15,760	33,063
Radio valves	2,438	3,747
Refrigerators, electric	13,762	27,908
Transformers and parts	13,758	21,008
Telephone material	10,555	21,804
Stoves over 35A	5,375	7,994
Rangettes	524	960
Grills, etc.	1,143	1,966
Electric flat irons	2,149	2,267
Electric toasters	1,044	1,218
Water tank heaters	1,171	1,724
Cutouts and fuses	1,507	2,327
Switchgear and protective equipment (except telephone)	8,691	14,616
Wiring devices	7,056	10,431
Welding apparatus	1,526	2,273
Apparatus and parts, not elsewhere specified	22,771	22,076

the figures for 1946 in each case. In paper-insulated lead-covered power cable the increase in value was sixfold. Magnet wires were valued at $9,013,000, compared with $4,418,000 in 1946.

The figures relating to Canadian production of electric lighting fixtures indicate that in industrial and commercial undertakings fluorescent tubes are supplanting incandescent lamps. Fluorescent lighting is also making considerable headway in the home.

Landlords and Installations

THE Electricity Act Amendment Bill is now before the Western Australian Parliament. This will give powers to enable electricity supply authorities to carry out repairs to dangerous fittings or installations in homes and charge the work to the owners. The Bill has been framed to protect tenants from landlords who refuse to comply with orders issued by supply authorities to carry out electrical repairs to their premises. At present, if an owner fails to comply with such an order the premises are disconnected from the supply, which imposes a hardship on the tenant.

South African Commission's 25 Years

MANY interesting incidents in the history of the South African Electricity Supply Commission are recorded in a handsome illustrated book, published to mark the completion of twenty-five years. It is related, for example, that when a line was erected between Glencoe and Newcastle (Natal) the official switching-on ceremony had an unfortunate sequel. During the night a severe thunderstorm caused a breakdown of the supply, and it was found that seven of the pin-type insulators had been shattered. A plan of reconstruction was rapidly worked out, disc and suspension insulators being used in place of the pin-type. The original configuration was delta, with one insulator at the top of the pole and the other two at the ends of a cross-arm. The cross-arm was shifted to the top of the pole, and on it was mounted a bow roughly semi-circular in shape. From the highest point a string of three discs was suspended, with two similar discs from each end of the cross-arm. The reconstructed line has operated for many years with great reliability.

In a country where large birds are numerous, particular attention has to be paid to the protection of overhead lines. After observing the habits of birds with a large wing-spread, it was concluded that if there were an obstacle in the way of a bird alighting with outstretched wings, it would seek some other resting place. A simple device was accordingly fitted, and the only recorded case of trouble on a line so protected occurred when an owl, which must have overbalanced, came in contact with the pole while hanging from the conductor.

Threat to Power Station

At one time the existence of the Salt River station was threatened by enormous quantities of sand and seaweed sweeping into the intake works. It happened that at the time the Railways and Harbours Administration was proposing to build new docks in Table Bay, and the suggestion was made that instead of the rubble mole projected, a hollow one should be built to carry all the Administration's services and also convey water from the dock basin to the power station. In this way the situation was saved.

Symbolical of the growth of the Commission's operations, photographs are reproduced showing its successive headquarters. The first was a three-storey building, to which a fourth storey was later added. The present Escom House, Johannesburg, officially opened by General Smuts in 1937, has twenty-one storeys and rises to a height of 236 feet.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1940

G. B. MOSSIN.—"Electrical heating devices for buildings and the like." 1298. 16th January, 1939. (614385.)

Centre National de la Recherche Scientifique.—"Apparatus for the production of energy by nuclear fission." 7782. 2nd May, 1939. (614386.)

1944

British Thomson-Houston Co., Ltd. (General Electric Co.).—"Electric frequency changing systems." 1067 19th January, 1944. (614304.)

1945

Foster Instrument Co., Ltd., and C. E. Hackett.—"Resistance thermometers." 10275. 24th April, 1945. (614628.)

Marconi's Wireless Telegraph Co., Ltd.—"Electron-discharge devices." 13621. 30th July, 1943. (614313.)

International Resistance Co.—"Electric resistors and method for their manufacture." 14009. 2nd June, 1944. (614629.)

General Electric Co., Ltd., and J. C. Adams.—"Lighting fittings for use for example on airfields." 14029. 4th June, 1945. (614630.)

Patelhold Patentverwertungs- & Elektro-Holding Akt.-Ges.—"Electron tubes." 15471. 20th June, 1944. (614314.)

Telefonaktiebolaget L. M. Ericsson.—"Connector device for making the electrical connection between a cable and a contact member." 15483. 19th June, 1944. (614468.)

Metropolitan-Vickers Electrical Co., Ltd., A. H. Gray and G. L. Brown.—"Automatic electric regulating systems." 16920. 3rd July, 1945. (614631.)

Standard Telephones & Cables, Ltd.—"Radio direction finder systems." 28251. 6th April, 1942. (614409.)

Marconi's Wireless Telegraph Co., Ltd.—"Electron trigger circuits." 33074. 27th July, 1944. (614328.)

Benjamin Electric, Ltd.—"Lighting fittings." 34546. 23rd December, 1944. (614331.)

1946

Standard Telephones & Cables, Ltd., and C. W. Earp.—"Electric counting and timing apparatus." 917. 10th January, 1946. (614417.)

Marconi's Wireless Telegraph Co., Ltd.—"Beam-deflecting circuits for cathode-ray tubes." 1184. 13th January, 1945. (614418.)

Philco Radio & Television Corporation.—"Pulse delay system." 3709. 29th April, 1944. (614550.)

Automatic Telephone & Electric Co., Ltd., and J. E. T. Parker.—"Time delay circuits." 5100. 19th February, 1946. (614472.)

Marconi's Wireless Telegraph Co., Ltd., and C. W. Rich.—"Electron-discharge tube amplifying, repeating and modulating circuit arrangements." 5503. 21st February, 1946. (614421.)

Compagnie Générale d'Electricité.—"Insulating head for electric cables under high fluid-pressure." 6892. 3rd April, 1942. (614426.) "Insulating head for electric cables withstanding high fluid-pressure." 7033. 12th December, 1943. (614427.)

L. E. Ryall.—"Loudspeaker telephone systems." 7301. 8th March, 1946. (614638.)

Westinghouse Electric International Co.—"Dispensing of beverages." 7504. 16th March, 1945. (641431.)

P. Lyons.—"Electrodes for use with electrotherapeutic appliances." 9000. 23rd March, 1946. (614552.)

Philips Lamps, Ltd.—"Locking device for electric-light and like fittings." 11009. 29th August, 1941. (614440.)

R. A. S. Reid.—"Electrically driven pumps." 12037. 18th April, 1946. (614442.)

W. P. Boase.—"Self-propelled electrically driven trucks." 13109. 1st May, 1946. (614445.)

J. E. P. Verneaux.—"Electrical apparatus for performing arithmetical calculations." 13919. 4th October, 1943. (Cognate application 13920/46.) (614639.)

B. V. Bowden.—"Electrical transmission lines." 14804. 17th May, 1945. (614450.)

Etablissements Labinal.—"Snap-action mechanisms applicable, inter alia, to electric switches." 14995. 7th May, 1945. (614451.)

I. S. Forbes and K. W. G. Harrod.—"Operating voltage supply arrangements for cathode-ray tube apparatus." 15259. 20th May, 1946. (614557.)

W. S. Elliott.—"Pulse radar systems." 15499. 22nd May, 1946. (614336.)

Philips Lamps, Ltd.—"Thermionic valve amplifiers for producing balanced sawtooth currents or voltages." 16536. 1st June, 1945. (614454.)

R.F. Equipment, Ltd., and A. W. Keen.—"Electric circuits incorporating electronic-discharge devices." 17243. 6th June, 1946. (614560.)

Philips Lamps, Ltd.—"Electric-discharge tubes comprising one or more secondary emission electrodes." 20016. 17th April, 1942. (614457.)

General Electric Co., Ltd., and H. C. E. Jacoby.—"Electric motors." 20747. 11th July, 1946. (Cognate application 13112/47.) (614348.)

Johnson, Matthey & Co., Ltd., A. R. Powell and J. C. Chaston.—"Alloy." 20751. 11th July, 1946. (614349.)

Western Electric Co., Inc.—"Electrical translating devices employing contact rectifiers." 20779. 27th July, 1945. (614355.)

Igranic Electric Co., Ltd.—"Electrical contacts." 20909. 12th July, 1945. (614372.)

British Thomson-Houston Co., Ltd.—"Fluorescent electric-discharge lamps." 20925. 21st April, 1945. (614462.)

H. Hyman.—"Electric dry batteries." 20930. 12th July, 1946. (614373.)

Soc. Francaise Radio-électrique.—"Arrangements for secret telephony. 20963. 8th May, 1944. (614572.)

Standard Telephones & Cables., Ltd., and W. E. Laycock.—"Manufacture of magnetic bodies from finely divided magnetic materials." 21010. 13th July, 1946. (614476.)

British Insulated Callender's Cables, Ltd., R. W. Blades and R. H. Atherton.—"Form of electric junction box." 21027. 13th July, 1946. (614477.)

F. Greaves and A. Heys.—"Remote controlled speed controller for electric motors." 21074. 15th July, 1946. (614480.)

J. Lucas, Ltd., and A. Huyton.—"Electric ignition means for internal-combustion prime movers." 21085. 15th July, 1946. (641481.)

General Electric Co., Ltd., and E. S. Friedlander.—"High-frequency inductor alternators." 21146. 15th July, 1946. (614486.)

Intra-Therm Corporation.—"Dielectric heating apparatus." 21151. 16th July, 1945. (614585.)

Parsons & Marine Engineering Turbine Research & Development Association, T. W. F. Brown and H. G. Yates.—"Power plant transmission gearing." 21158. 15th July, 1946. (614645.)

Safeway Heat Elements, Inc.—"Electrical heating elements." 21163. 25th February, 1946. (614587.)

Compagnie Générale de Télégraphie sans Fil.—"Wave-guides and wave-guide filter arrangements." 21195. 18th February, 1944. (614588.)

Philips Lamps, Ltd.—"Wireless sets comprising one or more sliding-core coils." 21226. 3rd September, 1942. (614492.) "Devices comprising electric gas-discharge tubes." 21228. 17th September. 1942. (614493.)

J. W. Atkinson, W. S. Sutcliffe. I. D. Briggs and B. Cronin.—"Electric light fittings." 21240. 16th July, 1946. (614494.)

Foster Transformers & Switchgear, Ltd., and R. I. Bagnall.—"Electrical switching devices having overload release." 21241. 16th July, 1946. (614651.)

British Thomson-Houston Co., Ltd.—"Refrigerating

systems." 21300. 18th July, 1945. (614500.)

G. E. Partington.—"Radar apparatus." 21316. 16th July, 1946. (614595.)

D. J. Cowden. — "Thermally-operated electric switches." 21335. 17th July, 1946. (Cognate application 3340/47.) (614596.)

Pritchett & Gold & E.P.S. Co., Ltd., E. M. O. Honey and C. R. Hardy.—"Electric accumulator containers." 21373. 17th July, 1946. (614505.)

Mallory Metallurgical Products, Ltd., and C. C. Hyde.—"Composite material suitable for bearings or electrical contact elements and the like." 21407. 17th July, 1946. (614598.)

J. S. Molleroj and S. Stigsgaard.—"Electric power cables." 21410. 17th October, 1945. (614508.)

British Thomson-Houston Co., Ltd.—"Starting arrangements for electric-discharge devices." 21432. 9th July, 1945. (614509.)

Landis & Gyr Soc. Anon.—"Automatic electrical cut-out. 21442. 1st August, 1945. (614510.)

English Electric Co., Ltd., General Electric Co., Ltd., and C. A. Wilson.—"Terminal clamping screws." 21447. 17th July, 1946. (614602.)

J. Pearson.—"Electric coupling sockets." 21476. 18th July, 1946. (614604.)

British Thomson-Houston Co., Ltd.—"Tube drawing mandrels." 21486. 19th July, 1945. (614513.)

Pyrotenax, Ltd., and G. D. Clothier.—"Devices for sealing the ends of electric cables." 21519. 18th July, 1946. (614516.) "Closure members for devices for sealing the ends of electric cables." 21520. 18th July, 1946. (614517.)

Metropolitan-Vickers Electrical Co., Ltd., and A. Mandl.—"Fluorescent lighting systems." 21526. 18th July, 1946. (614519.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Voltage impulse-generators." 21530. 22nd March, 1943. (614520.)

Philips Lamps, Ltd.—"Device for detecting the transmission of high-frequency electrical energy through a conductor." 21532. 5th August, 1942. (614607.)

D. T. Shaw.—"Multi-contact electrical connector." 21641. 19th July, 1946. (614674.)

C. A. Parsons & Co., Ltd., and F. W. Gardner.—"Turbine blading or the like." 21683. 19th July, 1946. (614678.)

Chloride Electrical Storage Co., Ltd. (E. L. Longaker).—"Electric storage batteries." 21684. 19th July, 1946. (614679.)

Farnsworth Television & Radio Corporation.—"Frequency divided circuit." 21686. 17th October, 1945. (614680.)

A. W. M. Hartley, J. R. Jones and R. S. Akers.—"Electric junction and fuse boxes embodying switches." 21695. 19th July, 1946. (614681.)

Irish Domestic Electrical Appliances, Ltd., and J. Quinn.—"Immersion heaters having thermal switches." 21743. 8th March, 1946. (614690.)

Farnsworth Television & Radio Corporation.—"Signal level control circuit using thermionic valves." 21821. 25th October, 1945. (614691.)

J. A. C. Malchus.—"Vacuum cleaners." 21928/9. 15th April, 1943. (614540/1.)

General Electric Co., Ltd., English Electric Co., Ltd., and J. W. Gibson.—"Fuse elements." 22054. 24th July, 1946. (614615.)

M.K. Electric, Ltd., C. L. Arnold, R. W. Dowsett and J. R. Duffield.—"Electric tumbler switches." 22096/7/8. 24th July, 1946. (614617/8/9.)

Macfarlane, Arthur & Co., Ltd., and T. A. G. Smith.—"Electric switches of the push-bar type for lampholder sockets and the like." 22147. 25th July, 1946. (614694.)

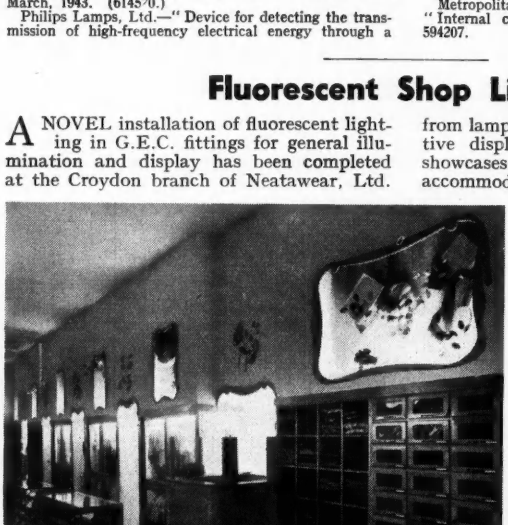
British Thomson-Houston Co., Ltd.—"Preparation of luminescent material." 22190. 5th May, 1945. (614700.)

Amended Specification

Metropolitan-Vickers Electrical Co., Ltd., and anr.—"Internal combustion turbine plant for propulsion." 594207.

Fluorescent Shop Lighting

A NOVEL installation of fluorescent lighting in G.E.C. fittings for general illumination and display has been completed at the Croydon branch of Neatawear, Ltd.



"Osram" concealed fluorescent lighting in a store

The "Osram" 2ft 20W lamps have proved particularly convenient for this installation, where both the indirect lighting of the shop and illumination of special displays derive from lamps concealed in the bases of decorative display features above the ordinary showcases; 4ft lamps could have been accommodated only by recessing the ends into the wall. The display features are known as "shadow boxes," being designed to give a perspective effect rather than flat lighting to the goods shown in them. At the same time the light thrown outwards and upwards from the boxes gives uniform general lighting to the shop by reflection from the walls and ceiling. "Warm white" lamps are used throughout. There are twenty-one shadow boxes with the 2ft lamps, together with two somewhat larger boxes at the ends of the shop, each containing a 4ft lamp. Each showcase contains one 4ft lamp, and two 4ft lamps light the window display.

The contractor for the installation was M. Hyams, London, S.E.5.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—CAIRNS.—12th February. Regional Electricity Board. 22-kV and 6.6-kV switchgear. (E.P.D. 44475/48. Ten/85.)*

Argentina.—BUENOS AIRES.—The closing date for the receipt of tenders by the Directorate General of Water and Electric Power for the supply of plant for No. 2 power station at Andalgala has been extended to 18th February. (E.P.D. 42022/48. Com/114A.)* That for switchboards and transformers for the "4 de Junis" power station has been extended to 18th March. (E.P.D. 43901/48. Ten/27A.)*

Huddersfield.—17th January. Town Council. Electric lighting and power installations in the new County Primary School at Deighton. G. Crossley, education architect, Peel Street.

Oakham.—19th January. U.D.C. Wiring 94 houses for electric light and power. Surveyor, Council Offices.

Northumberland.—County Council. Installation of electric lighting and power points at the Bedlington Station county primary school. County architect, County Hall, Newcastle-on-Tyne.

Peterborough.—14th January. Education Committee. Installation of electric light and heating at Eastholm County Boys' School, New Road. L. Tait, chief education officer.

Southampton.—1st February. Town Council. Supply and erection of electrically driven pumping plant. J. Hawksley, waterworks engineer, Civic Centre.

Uruguay. — MONTEVIDEO. — 1st February. Usinas Electricas y Telefonos de Estado. Covered twin core cable. (E.P.D. 5533f/48. Ten/96.)* 8th February. Dry cells. (E.P.D. 55249/48. Ten/93.)*

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Orders Placed

Battersea. — Borough Council. Accepted. Electrical installations in dwellings at the Tyneham Road housing site (£3,559).—Phœnix Electrical Co. (London). Installation of an electric passenger lift (£1,458).—Express Lift Co.

Felling (Durham).—U.D.C. Accepted. Electrical installations in fifty houses being built at High Lanes, Heworth.—J. W. Gibson.

Isle of Ely.—County Council Education Committee. Accepted. Electrical installation at the Wisbech Elm Road County Primary School and Victoria Road Annexe (£657).—Mann Egerton & Co.

Rochdale.—Corporation. Accepted. Installation of electric lighting and power at the Heybrook School—B. French, Ltd.

Sunderland. — Corporation. Recommended. Electrical installation at the Valley Road primary infants' school (£2,017).—North of England Engineering and Electrical Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Berwick.—Bungalows, Spittal Hall Farm; borough engineer.

Blackburn.—Day nursery, Stancliffe Street; J. Whittaker & Sons (Blackburn) Ltd., builders, Bastwell.

Bolton.—Primary school, Long Lane, Breightmet, for Rev. J. A. Weston, P.P. St. Osmund's R.C. Church; H. Greenhalgh, architect, 15, Mawdsley Street.

Bradford.—Infants' schools, Ravenscliffe, Clayton and Buttershaw; city architect, Town Hall.

Bakery, Caledonia Street; Tout Bros., Ltd., 92, Caledonia Street.

Brighton.—Offices, Edward Street and John Street (£14,000), for T.C.; borough engineer.

Factory, Hollington Industrial Estate; Typewriter Sundries Co., Ltd., 30, New Bridge Street, E.C.4.

Bristol.—Infants' school, Lockleaze, and infants' school, Novers Lane; J. N. Meredith, city architect, Eagle House, Colston Avenue.

Works; Western Die-casting Co., Ltd., 11a, Leigh Street.

Burnley.—Houses (50), Lane Head; Middleton & Co. (Blackpool), Ltd., builders, Banks Street, Blackpool.

Chesterfield.—First sections of primary schools, Newbold and Whitecotes Lane; Wilcockson & Cutts, architects, 12, Saltergate.

Coventry.—Extensions to works, Maudsley Road (£20,000), for Modern Machine Tools, Ltd.; secretary.

Health Centre, Pool Meadow; D. E. E. Gibson, city architect, 1a, Warwick Row.

Cumberland.—Secondary school at Kells, Whitehaven; architect, 15, Portland Square, Carlisle.

Darlington.—Building programme for 1949 (200 houses) for T.C.; borough architect.

Flats (56), Haughton Road, for T.C.; direct labour.

Durham.—New departments at Durham Colleges; Professor Allen, 3, Devonshire Terrace, Newcastle.

Ealing.—Flats (32) and houses (12); borough engineer.

East Kilbride.—Two industrial estates for East Kilbride Development Corporation, Ltd., Terrance House; D. P. Reay, chief engineer.

Edmondsley.—Extensions, County School; Wright & Kellett, Ltd., 14, Ashley Terrace, Chester-le-Street.

Finchley.—Flats (102), East End Road; housing architect, The Avenue, Regent's Park Road.

Gateshead.—Infants' school (240 children) and junior school (320 children), Lobley Hill; H. J. Cook, chief architect, Municipal Buildings.

Gosforth.—Public hall and theatre; U.D.C. surveyor.

Hartlepool.—Factory for disabled men; C. S. Errington, 46, Grainger Street, Newcastle-on-Tyne.

Hazel Grove and Bramhall.—Bungalows and maisonettes (20) for U.D.C.; W. H. Matthews & Sons, Ltd., builders, 25, Norris Road, Sale.

Hebburn-on-Tyne.—Houses (200) for U.D.C.; T. A. Page, Son & Hill, 75, King Street, South Shields.

Houghton-le-Spring.—Houses (220); surveyor, U.D.C. Offices.

Kingston-on-Thames.—Technical college (£100,000), Penrhyn Road; J. Harrison, Surrey county architect, County Hall.

Lancashire.—County school at Haughton Green, Denton; G. Noel Hill, county architect, County Offices, Preston.

Nursery school, Dryden Street, Padiham, for Lancashire Education Committee (£15,465); Wm. Livesey & Sons, Ltd., builders, Nova Scotia Works, Blackburn.

Manchester.—Factory for J. A. Turner & Son, Ltd.; H. S. Fairhurst & Son, architects, 55, Brown Street.

Northenden. — Chapel, Brownley Road, Northen Etchells, for Unitarian Free Church trustees; secretary, H. Smith, 25, Park Avenue, Swinton.

North Riding.—School building programme in 1949 for the E.C. includes two schools at Scarborough, two at Redcar, one at Catterick and one at Saltburn; county architect, County Hall, Northallerton.

Highway depot at Mayfield Farm, Whitby (£4,000); county architect.

Rochdale.—Special school, High Birch (£30,000); W. H. G. Mercer, borough surveyor, Town Hall.

Royton.—Houses (24), Heyside estate, for U.D.C.; J. E. France, builders, 5, Assheton Road, Moston, Manchester.

Salford.—Rebuilding dye house and warehouse, Blackburn Place; Winterbottom Book Cloth Co., Ltd., 12, Newton Street, Manchester, 1.

Scotswood-on-Tyne.—New workshops for Vickers-Armstrongs, Ltd.; W. Moss & Co., St. Mary's Place, Newcastle.

Sedgefield.—Houses (75); R.D.C. surveyor.

South Billingham.—School canteen; Thornton Construction Co., 30, Bridge Street, Stockton-on-Tees.

Shrewsbury.—Houses (100), Oakfield estate; borough surveyor.

Stockport.—Secondary school, Vale Road, Reddish; L. Yates, education architect, Town Hall.

Extensions to motor repair works, Town Hall Square, for Hollingdrake Automobile Co., Ltd.; H. S. Fairhurst & Son, architects, 55, Brown Street, Manchester.

Sunderland. -Rehousing and adaptations, High Street, for Ministry of Pensions; K. Hudson & Sons, Ltd., St. Mark's Crescent.

Surbiton.—Houses (25) for employees, Balaclava Road; Metropolitan Water Board, 173, Rosebery Avenue, E.C.1.

Swindon.—Fire station, Drove Road, for Wilts C.C.; county architect, Trowbridge.

Twickenham.—Houses (62), Collingwood Close; borough engineer.

Shops and flats, 19-31, High Street, Whitton; Varley Estates, Ltd., 136, Regent Street, W.1.

Tynemouth.—Junior department, Collingwood primary school, for E.C.; R. W. Gregory & Partners, consulting electrical engineers, Pilgrim House, Newcastle-on-Tyne.

West Riding.—Dining room and kitchen block, Training College, Bingley (£13,500); H. Bennett, West Riding county architect, County Hall, Wakefield.

Widdington.—Houses (84), Morpeth R.D.C.; Manchleu & Weightman, Saville Row, Newcastle.

Wood Green.—Flats (56), Vincent Road; borough engineer, Town Hall.

Workington.—Houses (102), Westfield site, for T.C.; John Laing & Son, Ltd., builders, Dalston Road, Carlisle.

Trade Marks

RECENT applications for the registration of trade marks include the following, objections against which may be entered within a month from 31st December:—

FLEXIPIN. No. B667,366. Class 9. Electric plug and socket connectors.—British Mechanical Productions, Ltd., 21, Bruton Street, London, W.1.

IONOTRON. No. 656,570. Class 9. Static eliminators, being electrical apparatus.—United States Radium Corporation, New York. Address for service: c/o Cruikshank & Fairweather, 29, Southampton Buildings, Chancery Lane, London, W.C.2.

MAX-ARCLETTE. No. 667,815. Class 9. Electric welding apparatus, parts and fittings all included in Class 9.—Max-Arc Welders, Ltd., 190, Thornton Road, Croydon.

HAMCO. No. 648,208. Class 11. Electric heating, lighting, cooking and refrigerating apparatus.—The Hampton Timber Co., Ltd., Castle House, High Street, Hampton, Middx.

LA MONT. No. B661,967. Class 11. Steam generating installations and water-heating installations.—La Mont International Association, Ltd., 8, Waterloo Place, London, S.W.1.

ELECTRIC SYNCLOCK (design). No. 667,457. Class 14. Electric clocks.—Synclocks, Ltd., Colindale Works, Colindeep Lane, Hendon, N.W.9.

Export Enquiries

WE have received the undermentioned enquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of enquirers and manufacturers replying to them will no doubt require the usual references:—

India.—A Bombay firm wishes to get in touch with manufacturers or agents of presspahn and cork sheets with a view to placing large orders for this material (X.204).